

Computerworld Smithsonian Awards Dinner

The Search for New Heroes

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COMPUTERWORLD

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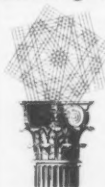
It's been a slow rollout for Oracle Version 6.0. While users worry about upgrades and pricing, Oracle has missed several ship dates. Page 4.

The odd machine out of the MVS/ESA game is the 4381. Few users are counting on it for their ESA needs. Page 93.

OS/2 Standard Edition is not recommended for Officevision, IBM says. You need PC-DOS or the proprietary OS/2 Extended Edition. Page 8.

Eight years after pioneering the graphical interface, Xerox sells licenses for the technology. Page 6.

Be glad you're not in Valdez, where running an IS site is truly a remote affair. Page 45.



Helping those whose hearing was once beyond hope of repair, the Kresge

Hearing Research Institute earns nomination for the *Computerworld* Smithsonian Award. Page 17.

Layoff law stirs fear of sabotage

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Planning on laying off more than 50 employees? Though you may not know it, the new federal plant-closing law applies to information systems, and you must now give employees 60 days' advance notice of layoffs. Then, experts say, keep an eye out for computer sabotage.

The controversial law was widely seen as protecting blue-collar workers, but new regulations state that white-collar

workers such as managers, programmers and data entry clerks are also covered.

Security professionals warn that the law may give disgruntled employees 60 days in which to tamper with company information systems.

That could be a big problem if the employees are knowledgeable about company systems, security or electronic funds transfer operations, according to Rick Curry, a data security officer at Riggs National Bank in Washington, D.C.

Curry said that ideally, he would want to take away system-access privileges from those employees, but that would mean they could not accomplish much work during the 60-day period. "A [terminated] data entry clerk would have no value to the corporation," he noted.

Sally Meglathery, director of
Continued on page 14

Officevision rivals play trump cards

BY STANLEY GIBSON
CW STAFF

Major office automation vendors probed for soft spots in IBM's Officevision strategy last week and outlined their own plans, which stress openness.

Data General Corp., Wang Laboratories, Inc., Hewlett-Packard Co. and Digital Equipment Corp. said they will support OS/2-based desktop devices in their office automation schemes but emphasized the inclusion of Unix and other desktop operating systems as well. Most of the firms are following IBM's lead in embracing a client-

server architecture.

The question of openness puts IBM's OS/2 Extended Edition on the spot. Although all the vendors vowed OS/2 support, none would commit at this time to support OS/2 Extended, which has ties to proprietary IBM communications and database management systems. IBM has stated that OS/2 Extended is necessary for full Officevision functionality.

DEC, whose All-In-1 package running on its VAX systems has been a thorn in IBM's side for years, vowed it will integrate that software with Apple Computer, Inc.'s Macintosh, Unix, VMS and OS/2-based desktop systems. DEC announced a program to integrate Decwindows with All-In-1 in January. That program is expected to bear fruit next year in a VMS-based Vaxstation running a Decwindows version of All-In-1.

"We accept the multivendor desktop as a fact of life," said Gene Hodges, DEC's group manager for office information systems. In contrast, he pointed to IBM's Officevision as "propri-

Continued on page 8

IBM enlists Ethernet troops in OS/2 Extended campaign

BY ELISABETH HORWITT
and JEAN S. BOZMAN
CW STAFF

WHITE PLAINS, N.Y. — A week after it promised to provide Ethernet support for OS/2 Extended Edition, IBM kept its word.

IBM said it has enhanced the upcoming OS/2 Extended Version 1.2 — not the current Version 1.1 — to communicate over any Ethernet board that complies with the Network Driver Interface Specification, a software interface developed jointly by 3Com Corp. and Microsoft Corp.

IBM also enlisted a trio of local-area network vendors to declare support for OS/2 Extended.

The remaining question, however, is how quickly and effectively IBM and its partners will provide the upper-level software that will allow customers' existing Ethernet applications and non-OS/2 workstations to

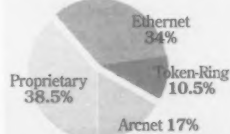
communicate with OS/2 Extended systems.

IBM firmly maintained its position that its LU6.2 Advanced Program-to-Program Communications protocol is the way to go.

Continued on page 92

LAN distribution

Percent of installed PC LAN nodes in 1988



SOURCE: INTERNATIONAL DATA CORP.

Back rooms moving out of IS house

BY CLINTON WILDER
CW STAFF

The old service-bureau concept of the 1960s and '70s is making a comeback — with a late-1980s twist.

Spurred by the need to cut IS costs — often under the weight of increasing corporate debt — many companies are turning to processing-services vendors to replace their own computing hardware and data centers. But unlike the past, the user companies are continuing to develop and maintain their own applications while running them remotely in the vendor's data center.

"It's expensive to keep and maintain competent systems programmers," said Alan Hamersmith, an independent consultant in Princeton Junction, N.J., and a former information systems executive at W. R. Grace & Co. "If a company is

looking to reduce processing expenses — and most of them are — they have to consider this."

Advocates of the process, which is commonly referred to as "outsourcing," are motivated most of all by cost savings. However, they also cite other advantages,

including the freedom to concentrate on business-supporting applications.

"We now spend all our time and energy on things that help bring profits to the bottom line, not just the day-to-day things to

Continued on page 4

Stepping out

Selected firms that have opted for the outsourcing solution

Company	Motivation
American Standard	Debt from 1988 leveraged buyout forced IS cost-cutting
Copperweld	Steel industry slump forced downsizing
Mosier	Chose to relocate processing from former parent American Standard after 1986 spinoff
Purina Mills	Relocated processing from former parent Ralston Purina after 1986 acquisition by British Petroleum
Rhone-Poulenc (U.S. division)	Relocated processing from former parent Chesebrough-Pond's after it was acquired from Stauffer Chemical in 1988
Sterling Chemicals	Relocated processing from former parent Monsanto after Sterling Group leveraged buyout

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Quotable

"We're going to see who blinks first."

GENE HODGES
DEC

On DEC's plans to oppose IBM's proprietary Officevision strategy by not supporting OS/2 Extended Edition. See story page 1.

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EXECUTIVE BRIEFING

■ **Competitors react to Officevision.** Data General, Hewlett-Packard, Wang and DEC say they'll outdo IBM with office systems that offer similar functions but connect to a wider variety of hosts and PCs. Unix and client-server architectures are common in each method. **Page 1.** IBM says you need its proprietary OS/2 Extended Edition or PC-DOS to connect to Officevision. Oddly, OS/2 Standard Edition won't work, except in DOS mode. Observers see it as a move to exclude non-IBM PCs. **Page 8.**

■ **The so-called plant-closing law** can affect IS staffers, not just blue-collar workers. The U.S. Department of Labor advises that the law — already the subject of a court case — requires advance notice for layoffs of 50 or more employees. The issue is raising security concerns in the IS community. **Page 1.**

■ **The service bureau may not be dead yet**, as indicated by some companies' moves to outsource for their CPU cycles. Frequently, those companies are driven to service-bureau-type vendors by the need to cut IS costs incurred during takeover battles. **Page 1.**

■ **The combination of Sybase's SQL Server and Unix workstations** seems to fit the plans of Salomon Brothers. The New York financial services firm sees a workstation/server strategy as a possible means to slow the growth of and reliance on IBM mainframe-oriented database management. **Page 37.**

■ **Next is chipping its way into the commercial IS market.** The firm's workstation features the ease of use and graphics needed to make it the new toy at New York Life Insurance. The insurer is one of several organizations evaluating Next systems. **Page 33.**

■ **A better mousetrap?** Printer vendors are working hard to come up with innovative products and enhanced functions, but cautious users are taking their time in making a commitment. New technologies — particularly in the nonimpact field — are appearing, but their introduction into the mainstream is more of a slow gathering of acceptance than an energetic burst of popularity. **Page 51.**

■ **Ex-TRW executive Richard Koeller** resurfaces in the top IS position at Whirlpool. Koeller, who left TRW in March when his department was consolidated

out from underneath him, will head a staff of about 200 IS professionals. **Page 4.**

■ **A new breed of interactive computers is on its way.** Despite early recognition of the need for humans to interact with their computer tools during problem solving, technical barriers have prevented this vision from materializing. But recent advances in computer graphics and supercomputing technology have challenged those barriers. A new class of interactive supercomputers holds promise similar to that of such problem-solving tools as the scanning electron microscope or the telescope at their inception. **Page 63.**

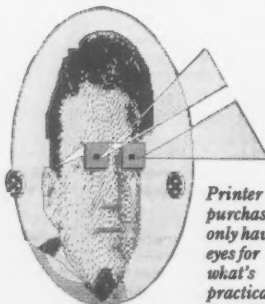
■ **Organizations need to consider the perspective of Cobol programmers** who are learning a fourth-generation language. The programmers should be encouraged to shed their 3GL outlook, learn database design, emphasize documentation and code efficiency in 4GLs. **Page 89.**

■ **Bankruptcies, takeovers and natural disasters** can happen to any software vendor and have inspired user companies to seek escrow agreements on their key software programs. Some of those IS shops now have enough experience to talk about the concerns and procedures to be addressed in such a contract. **Page 23.**

■ **Amtrak plans to replace thousands of terminals** and other equipment used for reservations and ticketing with more than 10,000 PCs as part of an 18-month, \$20 million project. **Page 7.**

ARCHIVE

Lawmakers in Massachusetts, whose economic 'miracle' is stumbling of late, are mulling tough, antihostile-takeover measures. (The state is also the headquarters of Prime, the computer industry's only hostile-takeover candidate.) While not making companies takeover-proof, Gov. Michael Dukakis' proposal would mandate broad protections for workers threatened with firings that result from a corporate raid. The problem is that many of the major takeover targets in Massachusetts, such as Prime, are registered in Delaware for tax purposes and would be immune from the measures. It's the thought that counts.



Printer purchasers only have eyes for what's practical. **Page 51.**

Tracking the Valdez oil spill may be the ultimate IS management challenge. **Page 45.**





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Koeller bounces from TRW into Whirlpool post

BY CLINTON WILDER
CW STAFF

BENTON HARBOR, Mich. — Former TRW, Inc. Vice-President of Information Services Richard D. Koeller, an avid gardener, did not let much grass grow under his feet.

Koeller will take over the top IS post at Whirlpool Corp. Thursday as vice-president of information technology, a newly created position and the company's first IS job at the vice-president level. He reports to James M. Sammartini, executive vice-president and chief financial officer of the home appliance manufacturer.

Koeller, 51, will head an IS staff of about 200 at Whirlpool. He left TRW in March after the Cleveland-based conglomerate consolidated its corporate IS

function and eliminated Koeller's position [CW, March 20]. Koeller saw his responsibilities at TRW beginning to shrink during the past year as his corporate IS staff was reduced to 85 people at the start of 1989 from a peak of 220. He became disillusioned with the diversified nature of TRW, in which the acquisition/divestiture strategy resulted in the diffusion of IS responsibilities, he said. In the aircraft components group in which Koeller began his TRW career, all six operating divisions



Koeller tends to his garden and to Whirlpool's systems needs

No. 1 appliance builder in the world, and their chairman, David Whitman, has a very strong feeling about the need to have strong IS activity."

Koeller joined TRW in 1981 as IS director of the aircraft components group and became vice-president of corporate IS in 1985. The Springfield, Ill., native previously headed information systems at International Harvester (now Navistar International Corp.) and began his IS career at Inland Steel Industries, both in Chicago.

Back rooms

FROM PAGE 1

keep the data center alive," said Bill Morgan, vice-president of IS at Copperweld Corp. in Pittsburgh.

Strapped for cash four years ago during the steel industry downturn, Copperweld closed its data center and moved its National Advanced Systems 80/53 to Genix Enterprises, Inc., a Pittsburgh-based outsourcing provider whose new bookings increased 54% in fiscal 1989.

"At first, there was some grousing from the people who wanted to be near the computer," Morgan said, "but I don't think any of them want to go back now." Morgan said that outsourcing played a big part in allowing Copperweld to slash its systems budget in half, to \$4 million per year.

San Diego-based Foodmaker, Inc., a billion-dollar restaurant chain operator, just signed a three-year extension of its processing-services contract with Litton Computer Services. Terry Babbitt, vice-president of IS, estimated that he saves about \$180,000 in salaries alone by going outside. "We consider Litton the computer experts, while we're the restaurant application experts," he said.

Many IS executives said they feel that mainframe processing cycles have become commodities, reducing the need to own those resources. "In a sense, it doesn't matter where you draw the line — whether you buy those resources from IBM or from a company providing access to them," said David Karney, vice-president of IS at Zale Corp. in Dallas.

Merger-mania has helped

spur the outsourcing trend because of the emphasis on IS cost-cutting and the divestitures of business units formerly tied to their corporate parent's data center (see chart page 1). Sterling Chemicals and Purina Mills, for example, both chose McDonnell Douglas Information Systems Co. instead of opening their own data centers after being sold by Monsanto Co. and Ralston Purina Co., respectively.

Tony Sugden, director of IS at Rhone-Poulenc, Inc., in Princeton, N.J., said outsourcing to a Genix mainframe allowed his firm to choose the application it wanted — McCormack & Dodge Corp.'s Fixed Assets. "We took advantage of that package across our businesses without having to invest in our own MVS machine," Sugden said.

Some say the arguments in favor of outsourcing would hold less water in larger IS organizations. The economies of scale in large firms should hold transaction costs below what a services vendor, with a built-in profit margin, could offer.

Outsourcing is not without its risks, said George Hathaway, a principal at the Index Group, a Cambridge, Mass.-based IS consultancy. "When you're in a multiple-user environment, your data shares devices with other companies' data, and there's a greater risk of inadvertent destruction of data," he said.

Nonetheless, some billion-dollar firms such as American Standard, Allegheny Ludlum Corp. and Foodmaker have made the outsourcing move, and more are reportedly considering it. "Once you can get over the 'I own the hardware' idea, it really makes sense," said Gary Biddle, American Standard's corporate vice-president of IS.

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Oracle 6.0 not breaking speedy release records

BY DOUGLAS BARNEY
CW STAFF

BELMONT, Calif. — Oracle rented the Concorde to announce its Oracle Version 6.0 transaction processing system last July, but the pace of deliveries has been something short of supersonic.

Oracle Version 6.0 represents Oracle Corp.'s boldest stab yet at providing high-performance database management. Its Transaction Processing Option (TPO), formerly called Transaction Processing Subsystem (TPS), is supposed to give the database management system performance comparable to the fastest products on the market. However, shipment delays and user worries about cost and migration have slowed the pace

of the much-anticipated rewrite.

At last year's announcement, company Chairman Lawrence Ellison said that by the end of 1988, "all our systems will be TPS systems."

However, critical pieces of Version 6.0 remain in Oracle laboratories. The PC Server version, which Oracle head of personal computer products Gene Shklar promised would be out early this year, is still unshipped. An Oracle spokesman said recently it would ship "this year."

The IBM MVS version, originally set to ship last year, will go into beta testing next month, Oracle said. An IBM VM version is also still in beta testing.

The Vaxcluster release of Version 6.0 is slated for delivery this summer. "We're still on target to ship this at that time," Or-

acle Vice-President Peter Tierney said.

Tierney defended the pace of Version 6.0 shipments. He said that platform now supported by Version 6.0 include VMS on VAX, Sun Microsystems, Inc. and Sequent.

He added that versions for Pyramid Technology Corp. and Data General Corp. machines will ship shortly and that Oracle will be "rolling out" Version 6.0 support on the other major platforms in coming weeks and months. A spokesman said Oracle has sold 420 Version 6.0 licenses.

Of great import

Tierney called the Version 6.0 project both massive and important. "There are 255,000 lines of new code in Version 6.0 [compared with Version 5.0]. It took us 2½ years. Not only did we rewrite the product; we changed the philosophy," he said.

But based on interviews with key Oracle users last week, there is no rush to shift DBMS

gears to the painstakingly created Version 6.0.

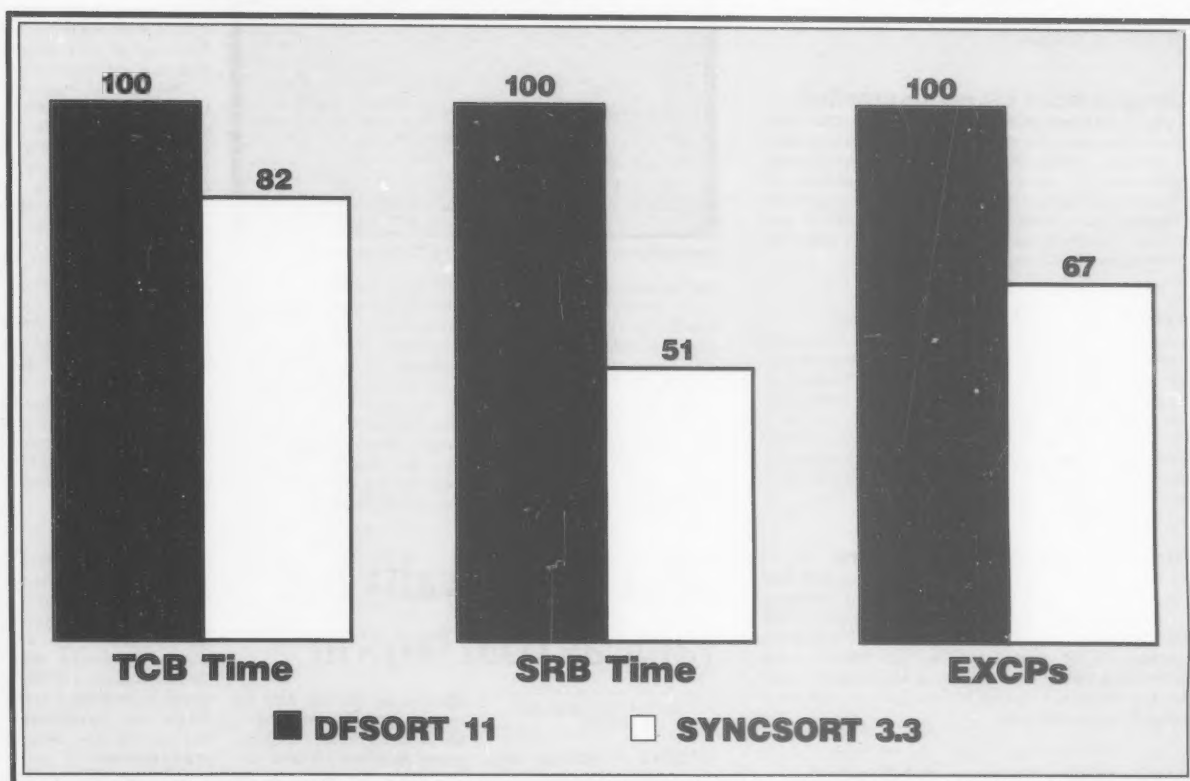
Customers are hearing that conversion to Version 6.0 is more difficult than conversion to previous versions because of the TPO component. "I've been to a class on migration. It doesn't look like it will be fun," said Dave Rossbach, a systems analyst and product administrator for Oracle at US West. Rossbach is waiting for the VM release of Version 6.0 to ship later this year to begin implementation.

Some customers are also irked by Oracle's plan to charge a hefty premium for the upgrade to Version 6.0 with transaction processing. Oracle said it will soon unbundle transaction processing to give users a choice.

"There should not have been a charge," said Jack Wilkerson, project engineer of manufacturing systems at John Deere & Co., who added that "we need Version 6.0 capabilities."

West Coast Bureau Chief Jean S. Bozman contributed to this report.

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NEWS SHORTS

Bullish on Brooklyn?

Merrill Lynch & Co. will move its main data center out of Manhattan and into either Jersey City, N.J., or Brooklyn, N.Y., according to DuWayne J. Peterson Jr., executive vice-president of operations, systems and telecommunications. In a speech last week, Peterson said the move will cut expenses in half and allow the securities firm to build an advanced computer center.

Fujitsu source-code facility opens

A secured facility was established in Tokyo last week as a result of last November's arbitrated settlement of the IBM/Fujitsu Ltd. source-code wars. Within its walls, certain Fujitsu employees not involved in software development will be allowed to examine and extract interface information from licensed manuals and source code as set forth in the arbitration agreement. One safeguard: Systems security expert and newly named facility administrator Eisuke Ikuta, according to the arbitrators' announcement, has been instructed "to make no additional statements now or in the future."

Micropro dons Wordstar moniker

Micropro International Corp., maker of the venerable Wordstar word processor, has changed its name to Wordstar International. The company, which earlier this month began shipping Wordstar 5.5, renamed itself in part to "eliminate the confusion we have always faced because Micropro is a relatively unknown name, whereas Wordstar is a household word throughout the world," said Gari Grimm, the firm's president and chief executive officer.

First turnkey LU6.2 application

Spectrum Concepts, Inc. in New York is expected this week to announce what it calls the first turnkey LU6.2 application for IBM's OS/2 Extended Edition. XCom6.2 for OS/2 is said to allow users to exchange files, jobs and reports with a wide range of computing environments supported by Spectrum's Xcom family, including Digital Equipment Corp. VAXs and IBM mainframes, System/36s and 38s and the Application System/400. Priced at \$950, the product is scheduled to ship in July.

Black boxes put out to pasture

Last week was the deadline for U.S. airlines to replace their old-fashioned flight data recorders — the on-board "black boxes" that provide data for airline crash investigations — with digital models that store data on magnetic tape for computer processing. The old versions, which log flight data by tracing lines with a mechanical stylus on foil tape, are less precise, easily damaged and require a special retrieval machine, the Federal Aviation Administration said.

Reservations merger challenged

Secretary of Transportation Samuel Skinner last week suggested challenging the proposed merger of the American Airlines' and Delta Air Lines' computerized reservation systems. In a letter to U.S. Attorney General Richard Thornburgh, Skinner said the structure of the proposed merger "poses a substantial likelihood of producing an adverse effect on airline competition." He said the proposed merger should be modified to include an additional airline owner and to ensure separate management and marketing of the reservation systems. A Delta spokeswoman said she did not believe Skinner's letter would further delay the merger, adding that the concerns he raised were addressed in the original system-merger proposal.

Unix V 4.0 meets X/Open standard

AT&T's Unix Software Operation confirmed last week that Unix System V, Release 4.0 — due for general availability this fall — will conform to the most current X/Open Portability Guide. The firm also said that 23 members of Unix International have received early tapes of the upcoming operating system.

Xerox seeks licenses for interface

BY J. A. SAVAGE
CW STAFF

In a move destined to muddy the waters of software copyrights even more, Xerox Corp. said last week it would seek license fees for its pioneering work on graphical user interfaces, which was carried out a decade ago at its Palo Alto Research Center.

The announcement from Xerox

cording to Xerox. "We still believe we could continue to do what we were doing without infringing, but we've had to spend a lot of time and effort over the years to avoid the picket fence," said David E. Liddle, chairman of Metaphor. Liddle worked for Xerox during the development of the interface technology.

Xerox's move to seek licenses, which had been expected

and Ashton-Tate Corp. have sued smaller companies, alleging infringement on so-called look-and-feel copyrights.

There was no consensus from legal analysts and industry observers as to what Xerox's licensing offer will mean. Even Apple acknowledges that its graphical interface development drew in part on work done by Xerox, although Apple maintains that its own work is well-protected by Apple copyrights.

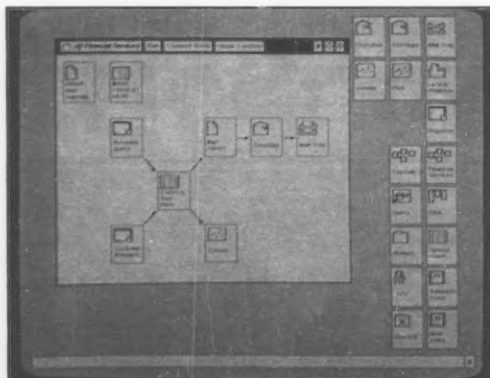
Xerox "will have difficulty enforcing its policy demanding licensing fees because they waited too long to do so, and the law isn't clear anyway," said attorney G. Gervaise Davis III, a specialist in intellectual property. "Yet if other companies have a Xerox license, it will make it difficult for Apple to sue them."

Two issues — money and the threat of litigation — will be the determining factor for other companies that already have some sort of graphical interface to license Xerox.

"What's cheaper, to pay Xerox or to fight it?" asked Dick Shaffer, editor of the "Technologic Computer Letter." Shaffer predicted legal ownership will have little to do with a company's decision to license from Xerox. Instead, he believes companies will evaluate it on the bottom line.

Xerox, meanwhile, has hinted that it will act vigorously to protect its copyrights and patents.

West Coast correspondent Patrick Waurzyniak contributed to this report.



Metaphor's interface at the heart of the licensing dispute

coincided with settlement of a suit with Metaphor Computer Systems, Inc. Metaphor licensed Xerox technology to avoid further litigation. Specifics of the agreement were not available.

"It's not outlandish; it's reasonable," said a Xerox spokesman about the cost of the license, which covers icons, window and menu design, keyboard action and scroll bars, ac-

[CW, April 10], comes at a time when the personal computer industry is littered with suits and countersuits over the issue of ownership of graphical interfaces. Last year, Apple Computer, Inc. sued both Microsoft Corp. and Hewlett-Packard Co., alleging illegal copying of Apple's user interface. Microsoft then countersued Apple, and both Lotus Development Corp.

MSA finds loyalty has value as IBM buys in

BY STANLEY GIBSON
CW STAFF

ATLANTA — IBM last week rewarded a committed Systems Application Architecture developer and paid \$10.1 million for a 5% stake in Management Science America, Inc. (MSA).

"We're ecstatic about it. In our turnaround situation, this gives us great credibility," MSA founder and Chairman John Imlay said. MSA had been plagued by losses in the past year.

"The symbolic significance is more important than the cash," noted Imlay, who said MSA had \$43 million in cash prior to IBM's purchase. Observers agreed that the investment restored prestige to the firm, whose financial situation had already begun to improve.

"This assures that MSA can carry out an extensive product redevelopment effort, gives MSA a very significant stamp of

approval and rewards them for being a loyal IBM supporter," said Kenneth Burke, vice-president at Alex Brown & Sons, Inc. Others saw the move as ensuring against a possible takeover of MSA. IBM does not "want MSA to fall into unfriendly hands that

might change MSA's direction," said Thomas O'Flaherty, director of research at Broadview Associates in Fort Lee, N.J. Imlay, however, denied there was any takeover protection involved, claiming that much of MSA was already in the hands of a few individuals and organizations and that Georgia state laws guard against takeovers.

MSA was the target of a buyout bid by Computer Associates International, Inc. last year.

In a spending kind of mood

The MSA investment is only one of several equity stakes IBM has taken in smaller companies during the last year. Others include the following:

- Interact Corp. (March 1989), a maker of software tools and compilers.
- Polygen Corp. (February 1989), a maker of pharmaceutical software.
- Transarc Corp. (May 1989), a start-up to develop AIX-based software.
- Interactive Images, Inc. (May 1989), a developer of tools that are intended for building graphical screens. IBM has unveiled a version of Interactive's Easel product that was designed to create screens for applications for the recently released Officevision.

DEC, under pressure, stalls bundling of DBMS, Ultrix

BY AMY CORTESE
CW STAFF

Digital Equipment Corp. has postponed plans to make public a deal that would bundle an unnamed database management system with its Ultrix operating system, an indication that it may be responding to pressure from independent DBMS vendors.

The company had previously told *Computerworld* it would make its an-

nouncement by May 16. Although DEC would not say which DBMS would be bundled, it was rumored to be Ingres from Relational Technology, Inc. (RTI).

The bundling of a runtime version of Ingres mirrors a recent DEC move to bundle its own RDB DBMS with Version 5.1 of its VMS operating system. A runtime version allows users to run applications based on a DBMS without buying a separate DBMS license.

While DEC has positioned RDB as a

strategic component of its VMS strategy, it has relied on third parties to provide DBMSs for Ultrix environments. DEC maintains a close relationship with RTI, selling that company's Ingres Tools for the VAX (VMS). DEC also supports other major third-party DBMS and tool vendors such as Informix Software, Inc., Unify Corp. and Oracle Corp.

Jim Barclay of DEC's corporate software engineering group said the Ultrix arrangement would not preclude similar agreements with other third-party software vendors.

However, a DEC spokesman said whatever the DBMS is, it will be "a Digital product — sold, licensed and supported by DEC." He added that the DBMS would be optimized for DEC's Ultrix open

systems environment, suggesting that DEC would do some modification.

The delay comes amid rumblings that DBMS vendors, including Software AG of North America, Inc. and Oracle, held discussions at a recent Adapso meeting on a possible lawsuit charging DEC with anti-trust violations for bundling RDB with VMS.

A DEC spokesman said the firm sees no legal impediment to the bundling.

Peter Tierney, senior vice-president at Oracle, said that at the Adapso meeting, John Maguire, chairman of Software AG, put forth a motion that Adapso investigate DEC's moves in bundling the runtime version of RDB with VMS on the grounds that the action was illegal, anti-competitive and bad for the industry.

Amtrak's \$20M PC conversion gets on track

BY MICHAEL ALEXANDER
CW STAFF

WASHINGTON, D.C. — The National Railroad Passenger Corp., better known as Amtrak, plans to spend \$20 million during the next 18 months to buy personal computers for its reservation agents.

Under Amtrak's Terminal Replacement Project, 10,000 to 20,000 personal computers will replace terminals and other equipment currently used for reservations and ticketing, according to Kenneth McIlvoy, director of user support and planning at Amtrak's information systems department.

"The terminals are 8 to 9 years old and have been worked really hard," McIlvoy said. "Maintenance has become a nightmare; getting parts is impossible."

Amtrak is seeking bids through July that would include IBM Personal Computer ATs (with Intel Corp. 80286 microprocessors) or compatible PCs equipped with floppy and hard disk drives and communications controllers for connecting the PCs to Amtrak's mainframes, ticket printers and other equipment. The winning vendor will also provide customized windowing software that will enable reservation agents to view train schedules and other productivity tools.

IBM, AT&T leading contenders

IBM and AT&T are top prospects to win the contract because they are the only two vendors bidding on the project that have the capacity to carry out the program on a nationwide scale, McIlvoy said. The terminal replacement project will begin at the end of the year and take about 18 months to complete, he added.

Upgrading the aging reservation terminals with PCs will enable Amtrak reservation agents at more than 470 reservation centers and stations across the country to reduce the time needed to handle each transaction, McIlvoy noted.

"We receive 31 million calls a year," he said. "Each second that we can save on every telephone call would be like having 11 more agents working for us."

The corporation has been under pressure to reduce its dependency on federal funding, which will amount to \$584 million for fiscal year 1989.

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Sun sparks Toshiba response

BY JAMES DALY
CW STAFF

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc. will make its most ambitious gambit yet for the hearts of software developers when it reveals tomorrow that Toshiba Corp. will offer a series of low-cost personal computers based on Sun's Scalable Processor Architecture (Sparc) by early next year.

The move not only gives Toshiba a chance to penetrate the lucrative U.S. workstation market but also puts a substantial player behind the 32-bit Sparc. If Toshiba is able to crank out enough machines, it may provide a powerful incentive for a wider range of independent developers to join the ranks of those porting applications to the reduced instruction set computing (RISC)-

based Sparc platform.

"It's Sun's way of saying, 'This is going to be one heck of a party, and you're really going to want to be a part of it,'" said Dick Shaffer, editor of the New York-based "Technologic Computer Letter."

Details later

Although specifics of the upcoming machines remain fuzzy, Toshiba's manager of product planning Makoto Ihara said the company will "fill the gap between PCs and workstations." Sun officials added that the machines will include the SunOS Unix operating system and the Open Look graphical interface, developed by Sun and AT&T.

Although Sun President Scott G. McNealy asserted that the move is "complementary, not competitive," analysts warned

that a crackerjack Toshiba product could spell trouble for Sun overseas.

Sun officials, however, shrug off that scenario, claiming that they have no product that fits the space the Toshiba machines will fill. "This is not a Sun vs. Toshiba issue; it's a Sparc proliferation issue," said Carol Broadbent, a spokeswoman for Sun.

While speculation has surfaced about the possibility of a laptop computer coming out of the arrangement, some analysts claimed that the caching requirements of a Sparc PC may be too great for a battery-powered portable.

Face in the crowd

The announcement, to be made with few particulars and at least seven months before any product arrives, may also be Sun's

way of staying noticed in an increasingly crowded market of RISC chip manufacturers.

RISC architectures are available from such companies as IBM, Integraph Corp., Apollo Computer, Inc., Hewlett-Packard Co. and particularly MIPS Computer Systems, Inc., which has made significant strides in establishing its chip as what many consider to be the de facto RISC standard.

While such firms as Solbourne Computer, Inc. and Arete Systems Corp. have developed around Sparc, progress has been slower than Sun would prefer. A much-ballyhooed October 1987 agreement with AT&T to implement Sparc on the next generation of AT&T's high-performance workstations has so far produced little.

Sun's only other alternative may be to hand-carve its own Sparc-based PC market. "Sparc needs two things to be successful: low-cost PCs and low-cost software. This fills the first part of that equation," said Michael Slater, editor of the Palo Alto, Calif.-based "Microprocessor Report," a technical newsletter. "Once the PC base is there, developers will take notice."

Toshiba, which is currently one of Sun's largest OEMs, will purchase the chips from one or more of the five semiconductor vendors licensed to develop Sparc chips. It will also license a complete software environment for Sparc/Unix-based computers from Sun. The machines will represent the first PC-class Sparc computers developed in Japan, Sun officials said.

Rivals

FROM PAGE 1

etary all the way," because of its emphasis on OS/2 Extended. While DEC embraces OS/2 Standard Edition, it will not support OS/2 Extended because that version only works with such IBM devices as communications boards, printers and monitors, he said.

"We're going to see who blinks first," Hodges said, explaining that IBM may have to withdraw the requirement that Officevision must run on OS/2 Extended. Even for dyed-in-the-wool IBM customers, IBM's scheme is too proprietary, he asserted.

A key battleground for all the vendors is the application software packages that users will run in addition to office automation. Although many expect applications to be written for OS/2, tangible products have been scarce thus far. That, the vendors say, leaves the door open for competing environments.

DG and HP are following parallel strategies, working together to create a common environment built around HP's Object Management Environment, DG, HP and a number of other organizations recently formed the Object Management Group (OMG), which aims to foster application development in HP's environment.

"The key to the future is third-party software vendors," said Chris Stone, group manager of distributed applications architecture at DG. He said DG could attract third-party developers by supporting Unix and the OMG. Because of the similarity between DG and HP's strategies, many developers could write for both DG and HP environments with little extra work.

DG is reportedly rewriting its Comprehensive Electronic Office package to run on the Motorola, Inc. 88000 reduced instruction set computing microprocessor. DG said it will move all of its systems to that architecture.

DG's overall strategy is based on its answer to IBM's Systems Application Architecture (SAA), called Distributed Applications Architecture (DAA). DAA uses OSF/Motif on Unix-based sys-

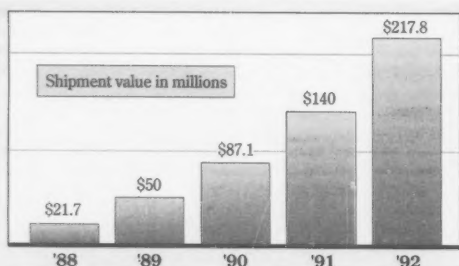
tem supports MS-DOS-based PCs on the desktop. HP said it will support OS/2 and Unix desktop devices as well, according to Ruane Ernst, director of marketing at HP's information systems group. However, HP has yet to decide which version of OS/2, Standard or Extended, it will support.

Meanwhile, Wang stresses LAN connectivity in conjunction with its imaging products.

"We feared IBM would

Local hero

With Officevision, IBM is bidding for a LAN-based office systems market that is projected to grow 78% annually



SOURCE: INTERNATIONAL DATA CORP.

CW CHART: DOREEN DAHLE

tems, Microsoft Corp. Windows on personal computers, IBM OS/2 Presentation Manager-based systems and X terminals. X terminals are dumb terminals that can perform windowing when connected to a Unix server.

Stone said DG will support OS/2 Standard only but did not completely rule out OS/2 Extended support in the future.

The major difference between DG and IBM, according to Stone, is that DG is embracing Unix, particularly as servers, while IBM is keeping Unix out of SAA.

HP's office automation package, Business System Plus, cur-

espouse the imaging market at the Officevision announcement. They didn't," said Ken Olisa, Wang's vice-president of worldwide marketing.

Although Wang is working on OS/2 development, Olisa said Wang customers are questioning the need to move to it because of the cost and lack of applications. "OS/2 is being bought by the True Blue customers only. These aren't Wang customers," Olisa said.

Wang currently boasts gateways to IBM's Professional Office Systems and Distributed Office Support System, and Olisa said Wang intends to develop interfaces to Officevision as well.

IBM's Officevision needs OS/2 Extended

BY DOUGLAS BARNEY
CW STAFF

Want to run IBM Officevision applications on a workstation? You'd best get OS/2 Extended Edition. In fact, you must get OS/2 Extended, a point that has some users squirming.

With Officevision, IBM has mounted a push for its proprietary OS/2 Extended, a version of the operating system jointly developed with Microsoft Corp. OS/2 Extended, at \$830, is a necessity for the kinds of cooperative processing applications that make up Officevision because of its built-in communications and data query facilities, said Tony Reardon, manager of integrated office offerings at IBM's Application Systems Division.

The role of OS/2 Extended was a source of confusion at the Officevision announcement because IBM did not specify why OS/2 Extended and PC-DOS were recommended for Officevision and why OS/2 Standard Edition was not. Ironically, IBM last week said that PC-DOS workstations can tie into Officevision more effectively than OS/2 Standard Edition.

Chief among the advantages of OS/2 Extended is its Communications Manager component, which provides LU6.2 peer-to-peer networking support. Because Officevision workstations will be attached to a variety of host systems, other Communications Manager facilities such as IBM's 3270 emulation, 5250 emulation and the ability to handle even ASCII for external data sources are all important, Reardon said.

Also, OS/2 Extended's Database Manager will be used to store documents, electronic mail and addresses in relational data-

bases on the workstation or the back-end host computer. In most cases, users will not have the actual database engine on their workstations. Instead, they will use the Database Manager's SQL facilities to access documents or data from remote systems.

With the DOS Data Base Requester, DOS workstations can query OS/2 Extended and retrieve Officevision documents. They cannot, however, run Officevision applications. OS/2 Standard workstations can neither run Officevision applications nor request data from OS/2 Extended.

Environmental support

"We support one of two requester environments: the PC-DOS workstation and OS/2, which has to be Extended Edition," Reardon said. He said that his understanding is that once he adds the needed communications services to OS/2 Standard, "You pretty much said what I have in Extended Edition."

The requirements for OS/2 Extended hike the price in several ways. First, OS/2 Extended itself costs \$490 more than Standard Edition. It also chews up more memory, resulting in the 8M bytes of random-access memory needed to run Officevision. The total costs can exceed \$10,000. "It is a very expensive way to put users on word processing and E-mail," said Nancy Carlini, IS manager at FNS Sales, Inc., a drugstore chain.

IBM calculated that the minimum amount required to purchase an Officevision workstation is \$7,300, including a Personal System/2 Model 50Z with 8M bytes of RAM, a color monitor, a Token-Ring board, OS/2 Extended and Officevision.

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Three cheer net services push

BY JEAN S. BOZMAN
CW STAFF

ANAHEIM, Calif. — The movement toward increasingly intelligent carrier-based network services gained a push from three major hardware vendors last

week with introductions at the Supercomm '89 show here.

The Unisys Corp., Digital Equipment Corp. and Stratus Computer, Inc. products were designed to run end-user communications applications on traditional hardware platforms that

work in concert with big central office switches such as AT&T's 5ESS

Regional holding companies are already looking to bring intelligent services such as information gateways on-line, according to Philip Quigley, chief

executive officer of Pacific Bell.

The mainframe-based systems would, in effect, be the forerunners of future Integrated Services Digital Network (ISDN) applications, said Tom Nolle, president of CIMI Corp. in Haddonfield, N.J.

Among last week's unveilings were the following:

- Unisys announced a Network Application Platform, based on a

Unisys A series mainframe, along with software that delivers voice store-and-forward, voice messaging and call-answering features.

The Unisys package could cost a regional holding company \$100,000 to \$17 million, depending on the number of mainframes installed.

- DEC announced a new and improved interface between its VAXs and central office switches, based on the Signaling System 7 standard, that is being used to route commands among ISDN switches. DEC's implementation, called VAX SS7, allows telephone switches, remote database servers and other hardware to pass commands and data for end-user services, DEC said.
- Stratus Computer in Marlboro, Mass., announced its OSI Server, which will allow telephone companies to support directory assistance and voice messaging as well as 911 and 800 services on a Stratus XA2000 fault-tolerant system. Stratus priced the OSI Server at \$2,200 for the version running on an XA2000 Model 50 and at \$4,800 for the one running on a high-end XA2000 Model 160.

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Wang ejects top execs

BY ELISABETH HORWITT
CW STAFF

LOWELL, Mass. — As part of its continuing merge-and-purge campaign, Wang Laboratories, Inc. has let go the directors of several of its most strategic organizations in recent weeks.

A Wang spokeswoman confirmed that the following people "no longer work at Wang."

- Peter McElroy, former director of corporate communications, a 15-year Wang employee.

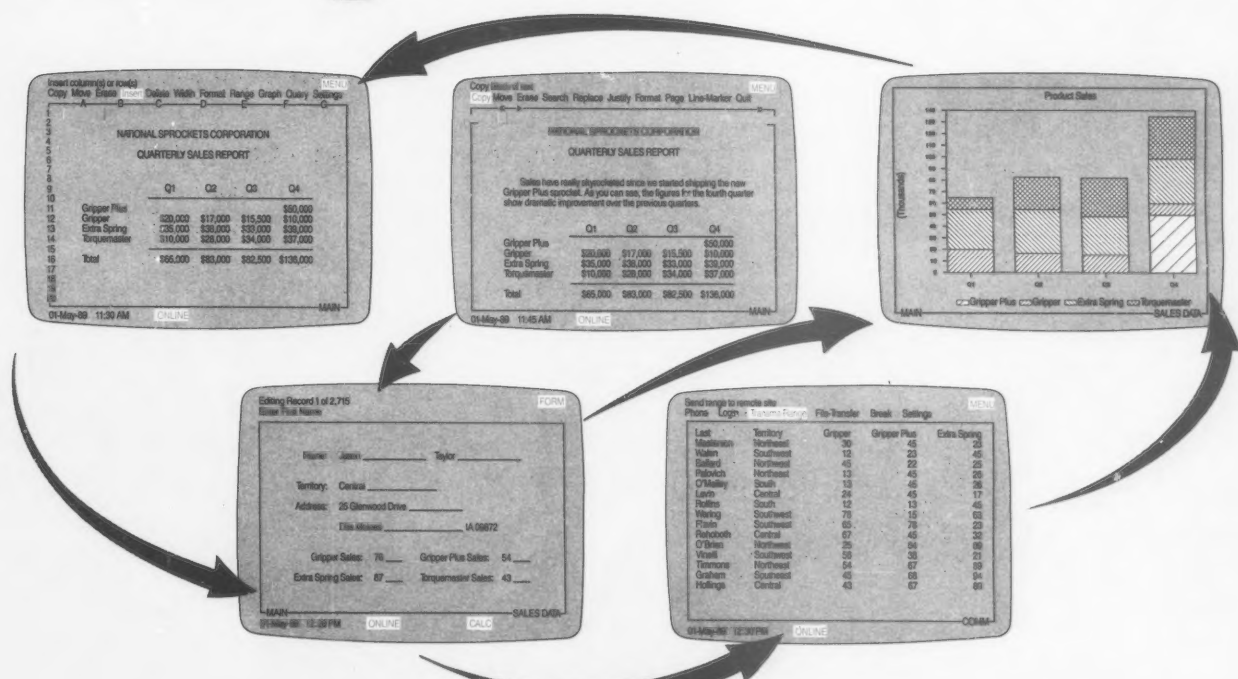
- Gus Ashton, former director of management consultant programs, who reported to McElroy.

- Tom Streck, former vice-president of the recently formed customer quality organization, which addressed the much-troubled customer relations at Wang.

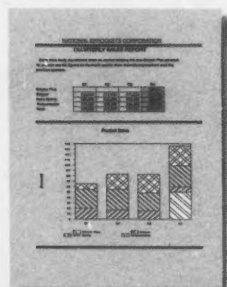
Wang Director Brian Toomey will assume McElroy's and Ashton's duties, a spokesman said. Toomey, who was in charge of internal corporate communications, now has both internal and external, the spokesman added.

"Wang traditionally has had a complex, multilevel hierarchy, and I imagine one of the goals of the reorganization and layoffs is to strip away some of those levels, so not all these jobs may be replaced," said Chris Christiansen, a former competitive analysis consultant at Wang, now a director of midrange systems strategies at Westport, Conn., consulting firm Meta Group, Inc.

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than if you'd developed equivalent applications with a high-level programming language. That way, your users don't have to know how the program works, only how to perform the applications you've developed.

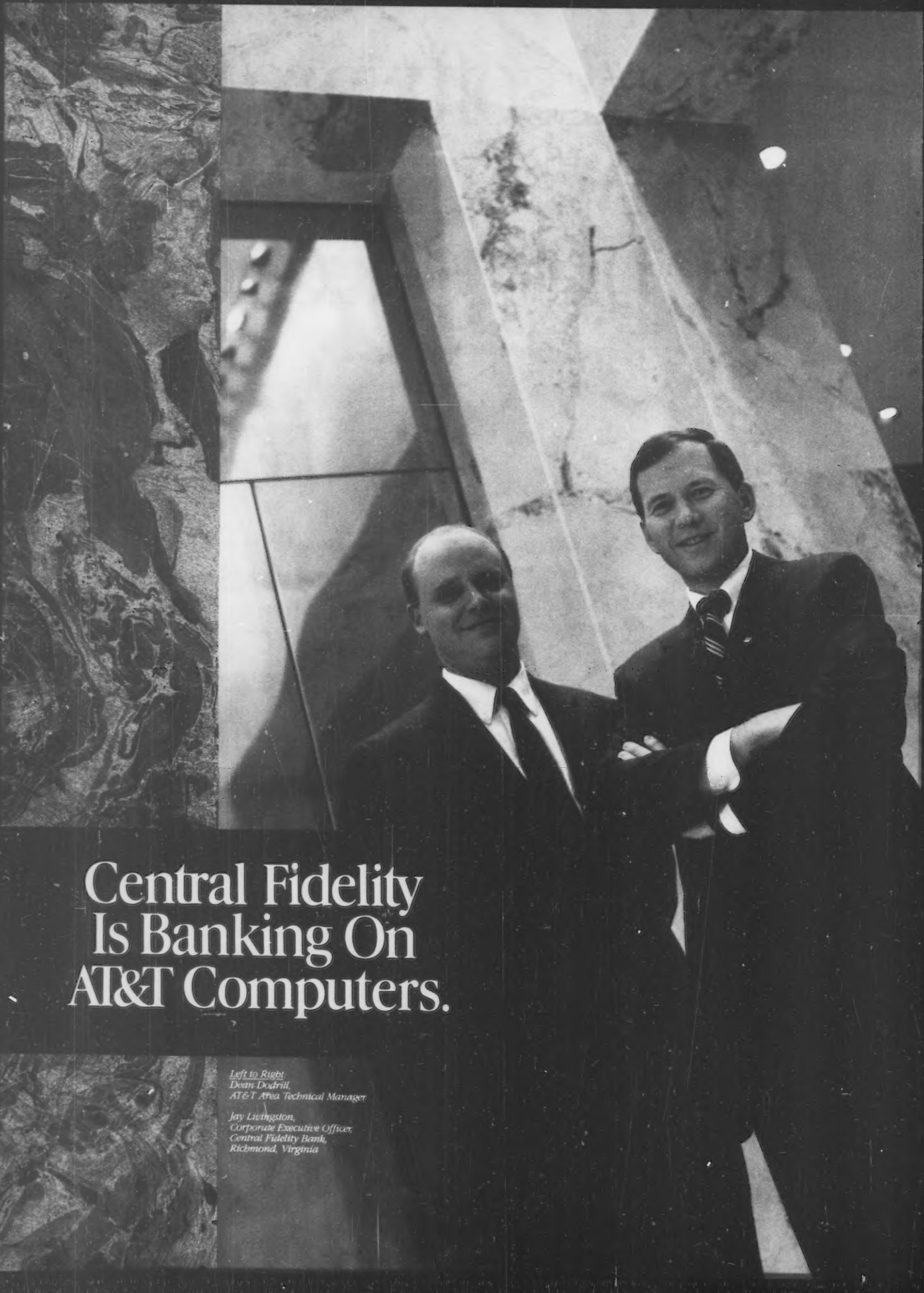
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Central Fidelity Is Banking On AT&T Computers.

*Left to Right:
Dean Dodrill,
AT&T Area Technical Manager*

*Jay Livingston,
Corporate Executive Officer,
Central Fidelity Bank,
Richmond, Virginia*

Richmond, Virginia
February 2, 1989

Central Fidelity Bank is among the nation's top 100 commercial banks with \$4.8 billion in assets. Looking to extend its fourteen-year record earnings streak, the bank commissioned its data processing division to deliver a vital strategic initiative, improve productivity, enhance sales opportunities, and provide faster customer service in the bank's nearly two hundred branch offices. Jay Livingston met recently with Dean Dodrill of AT&T to review their work together.

Jay: Service is what bank customers expect. Faster service improves customer satisfaction and leads to more profitable relationships. When you speed up service, everyone is more productive, and we can spend more time with customers selling the bank's financial products.

Dean: Service and selling both depend on information. Our challenge was to provide the branches with rapid access to customer information and present that information to branch personnel in the most meaningful way. This could only be accomplished with a distributed, networked computing approach.

Jay: That's right. Our first priority was service and sales support in our branches, which meant fast, accurate retrieval and dispersal of information was crucial. AT&T's banking architecture provided that.

Dean: Early on, you talked about cost-effectiveness, return on investment, and a strategy for future growth and functionality. Remember that?

Jay: With an emphasis on profitability. We had major investments in existing systems and a lot of branches. AT&T's open systems approach didn't require trade-offs or expensive host additions, which is one of the reasons

you got the business. AT&T's creative alternatives surprised us.

Dean: The ease of networking AT&T WGS computers was fundamental to our proposal. We delivered maximum functionality, flexibility, and reliability to every workstation in each branch.

Jay: And StarLAN was a terrific way to connect and share branch resources. You made the most of our assets, including the intangible ones.

Dean: Like your customer databases—we found ways to further develop relationships with existing customers. The applications development tools we built saved time for your developers. New products and services can now be added quickly to both platform and teller software, so service and sales can continually improve.

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Layoff law

CONTINUED FROM PAGE 1

IS security at the New York Stock Exchange, advised, "You should either find a way to give them 60 days off and have them leave the company or find a way to track their activities."

Experts said the law is likely to affect the securities, banking, savings and loan and other industries that are experiencing layoffs because of financial troubles, mergers or acquisitions.

The first legal test of the law involves Wall Street brokerage firm L. F. Rothschild, Unterberg Towbin. A class-action suit was filed in April by 250 former employees who did not get advance notice, including an unknown number of IS employees, according to New York attorney Jeffrey G. Smith.

The Worker Adjustment and Retraining Notification Act (WARN) was passed by Congress last year — over the objections of the Reagan administration and much of the business community. Its goal is to give workers time to seek other jobs and begin training programs and to give communities time to adjust as well.

The law went into effect Feb. 4, but the final rules for interpreting the law be-

came effective only last week. The U.S. Department of Labor advised employers to look ahead 90 days and behind 90 days to determine whether employment actions — either planned or already taken — will amount to a plant closing or mass layoff under the statute.

In addition to covering layoffs, WARN covers a plant closing if 50 or more employees lose their jobs during a 30-day period as a direct result of the closing.

"Thus, for example, if the 45-worker computer data entry department of a plant is closed and, as a direct result of that closing (and within 30 days of the closing), five computer programmers also are terminated, a covered plant closing has occurred," the Labor Department said.

In the 29 pages of fine-print regulation, the Labor Department acknowledged that the statute is quite complicated and that there will be ambiguous situations in which it is difficult to decide whether to give notice.

Furthermore, it is "prudent for employers to weigh the desirability of advance notice against the possibility of expensive and time-consuming litigation to resolve disputes where notice has not been given," the department said.

The rules will be enforced not by the government but through private civil lawsuits that can be filed by laid-off employees. In the suit against L. F. Rothschild, employees said they were not given proper notice and are seeking 60 days' pay and benefits, which could amount to as much

YOU SHOULD either find a way to give [laid-off employees] 60 days off or find a way to track their activities."

SALLY MEGLATHERY
NYSE

as \$2 million.

L. F. Rothschild is expected to argue that it is covered by one of the act's exceptions, which allows a faltering company to refrain from giving notice if it is trying to obtain financing for a recovery.

In simple terms

The key to interpreting regulations usually lies in the definitions of the terms, a point especially true for the rules clarifying the Worker Adjustment and Retraining Notification Act. The following are key definitions in WARN:

- **Employer:** Any business enterprise with 100 or more full-time employees. Includes nonprofit organizations and public institutions that engage in commercial enterprises, such as transit authorities and public utilities. Does not cover most federal, state or local government agencies.
- **Plant closing:** A permanent or temporary shutdown of a facility or operating unit that results in an employment loss for 50 or more employees during a 30-day period.
- **Mass layoff:** A reduction in work force (unrelated to a plant closing) that results in an employment loss for at least 50 employees or 33% of the work force.
- **Employment loss:** An employment termination other than a firing, voluntary departure or retirement, a layoff exceeding six months or a reduction in hours of 50% or more per month. Transfers and relocations are not included if the new site is within a reasonable commuting distance.
- **Affected employees:** Includes managerial and supervisory employees. Does not include independent consultants or contract workers.

SOURCE: U.S. DEPARTMENT OF LABOR

She also doesn't realize Hewlett-Packard makes PCs.



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IBM redoubles imaging market efforts

BY ROSEMARY HAMILTON
CW STAFF

IBM made another move toward the imaging market last week, this time with a small New York-based partner called Image Business Systems Corp. (IBS).

The two have agreed to market IBS' Imagesystem software on the IBM RT platform; this will be the first Unix-based imaging system for IBM. IBM has been developing both mainframe and midrange imaging systems at customer sites for nearly a year.

IBS also committed to IBM's Image

Object Content Architecture, a set of specifications for image exchanges that IBM released into the public domain late last year.

So far, IBS is apparently the only company that has committed to IBM's specifications. An IBM spokesman said that the firm made the specifications available last year but has not planned a hard push to make them an industry standard.

The relatively new imaging market has yet to establish any standards and badly needs them, according to Stephen Elliott, a partner at Arthur Andersen & Co. in St. Louis.

Elliott said that it is too early to say whether IBM's specification will catch on and noted that at this point, "No other vendor has mentioned it to me."

The RT-based system, which IBM and IBS will begin selling next month, will eventually be able to swap images with the other IBM imaging systems, according to George Febish, vice-president of sales at IBS.

However, additional transfer software must first be written. An availability date has not been set, he said.

A complete RT-based system includes Imagesystem software, which manages

the image traffic and storage; the RT host; IBM Personal System/2s, which serve as imaging workstations; a scanning device; and either Token-Ring or Ethernet networks.

A setup with five PS/2s will cost approximately \$400,000.

Lotus offers LAN compatibility, pricing options

BY DOUGLAS BARNEY
CW STAFF

CAMBRIDGE, Mass. — Aiming its sights at local-area networks, Lotus Development Corp. last week announced enhanced LAN compatibility and new packaging for its key applications.

The pricing and packaging scheme is in line with the one recently announced for Lotus' 1-2-3 Release 3.0.

Later this year, key Lotus applications will begin to ship in server, standard and node versions. First off the line will be network versions of the company's Manuscript word processor and Symphony integrated spreadsheet, both slated to ship next month.

Next up will be network versions of 1-2-3 Release 3.0 and Release 2.2, each scheduled to ship 90 days after the release of the standard versions.

Most Lotus applications will be compatible with IBM Token-Ring as well as Novell, Inc. and 3Com Corp. LANs.

With the new packaging comes a new pricing scheme. In general, node versions will cost \$200 less than stand-alone or standard versions and \$300 less than server versions. The server version comes with one license for one user. Adding licenses involves paying Lotus a fee and receiving documentation.

The server versions allow for concurrent use of program code and provide data and resource sharing. As with most networking applications, Lotus will provide file-locking.

Standard editions are able to run on a network but are accessible only by one user at a time. Server editions are intended for servers and provide access to all licensed network users. Node editions are essentially sets of documentation and provide an additional user license.

Lotus has certified these products for use on Novell's SF Network 2.15 and OS/2 Requester 1.1; IBM's Personal Computer LAN Program 1.2 and 1.3 and LAN Server 1.0; 3Com's 3+ software and 3+ Open LAN Manager 1.0; Share, Inc.'s Share 1.3; and Banyan Systems, Inc.'s Virtual Networking Software 3.0.

At the high end, you can get up to 8 accessory slots, 620 Mbytes of hard disk storage, and 16 Mbytes of RAM. And on all models, you get a choice of video solutions and the flexibility of using either 5.25" or 3.5" disks.

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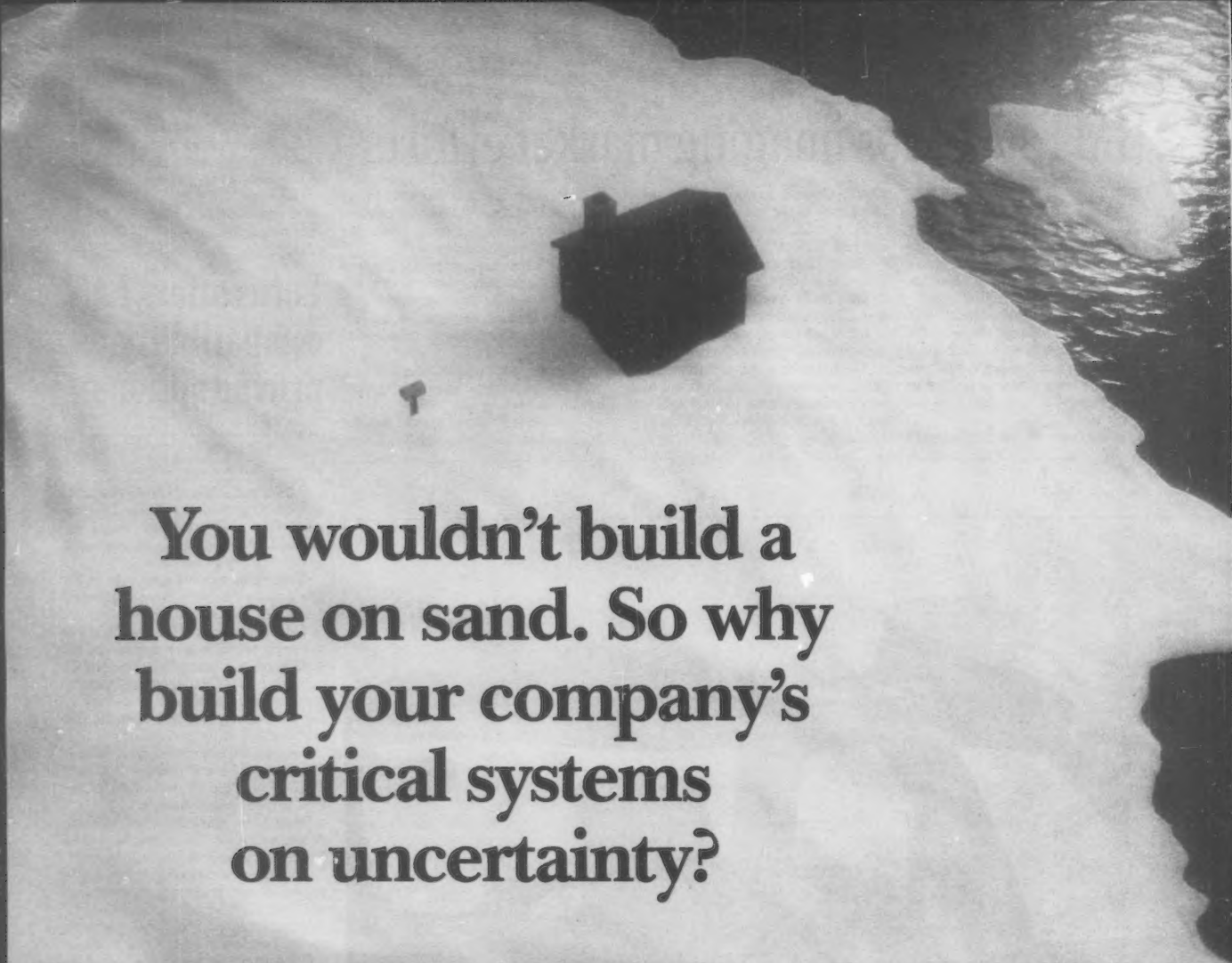
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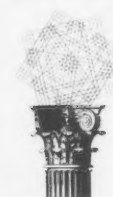
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Kresge develops prosthetic intended to restore hearing

Editor's note: This is one in a series of profiles of nominees for the Computerworld Smithsonian Awards, recognizing individuals and organizations that have achieved outstanding progress for society through the use of information technology. The awards will be presented in a ceremony held June 20 in New York.

BY ALAN J. RYAN
CW STAFF



sory organ.

People with this type of hearing loss can still process auditory information once it has reached the central nervous system, but they lack the organ located in the inner ear that passes along that information. Thus, roughly 5% to 10% of the deaf population is not treatable with current hearing implants.

Research conducted at the University of Michigan's Kresge Hearing Research Institute here uses CAD software on an Apollo Computer, Inc. workstation to design complex prosthetic devices that may allow sounds to bypass the hearing sense organ, explained David Anderson, professor of electrical engineering and computer science at the university. Anderson, one of 10 researchers involved in the auditory project, also holds a professorship in the ear, nose and throat department of the university's medical school.

Electrical stimulation

The goal of the institute's project is to deliver information about speech and other environmental sounds directly to the central nervous system through electrical stimulation, bypassing the portions of the

hearing system that no longer function, Anderson said. The prosthetic devices, designed using electrical CAD software from Mentor Graphics Corp., are intended to be implanted in the central nervous system at the point where the auditory nerve enters the brain stem.

The project would have been impossible without the use of CAD tools, according to Anderson. "The complexity of the circuit layouts and the cost of making an error in design or even in drafting requires that every possible test be applied to the designs before there is a commitment to silicon," he said.

It will likely be another two to three years before the first successful implant takes place, Anderson said.

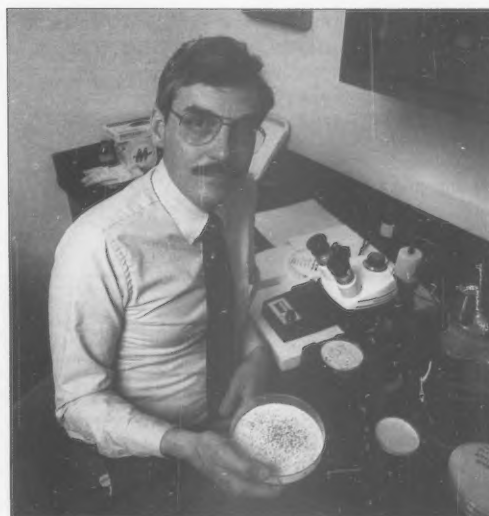
The group has been testing the devices in laboratory conditions to study their electronics and physical integrity. Once they are satisfied that a device is viable, it is tested on animals.

Even the most precisely designed implant device faces the possibility of rejection from a host system, in this case a test animal, Anderson said. But so far, he added, the tests on animals are progressing well.

"We have not achieved the long-term viability of the device that we would like to receive," Anderson said, "but the biocompatibility results look good."

During the tests, the device is stimulated so that the researchers can measure electrical responses from the animals, Anderson said.

Anderson said the group of researchers is also seeking more detailed data on what parts of the auditory system are stimulated when the unit is in use.



Anderson holds hundreds of newly processed recording probes

"This may not come until we are able to gather enough confidence to do a human implant," he said. That may be years away.

Once an implant is in place in the central nervous system, the sound would be picked up by an external electronic de-

cal research projects.

This research "is somewhat in the same category as 'orphan drugs,'" he said, referring to drugs developed for the benefit of a relatively small segment of the population.

However, he said, people today are more willing to accept the worthiness of the project even though a huge number of people will not be helped. "Ethically, it is reasonable to help somebody if there is technology to do so," he said.

The Kresge Hearing Research Institute has been studying the mechanisms of hearing for a number of years, and the central nervous system project has been under way for four years.

The project, if successful, will largely benefit deaf individuals who at some point in their lives were able to hear and understand. Most patients who have had this experience processing linguistic information possess the ability to interpret signals passed to them by electrical stimulation as meaningful sounds.

However, prelingual deaf children without hearing experience, because of their exquisitely adaptable nervous systems, could receive benefits from an implant comparable to those for adolescents and adults with hearing experience, Anderson said.

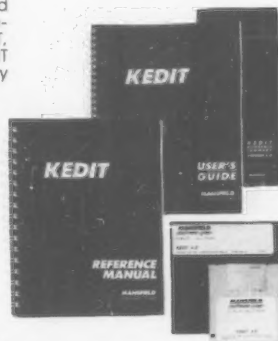
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Say goodbye to Wang 2200

BY ROSEMARY HAMILTON
CW STAFF

Wang Laboratories, Inc. last week retired the bulk of its 17-year-old 2200 line and replaced it with Intel Corp. 80386-based systems.

Wang said it adapted the old 2200 operating system to the new platform, which will enable current users to move over their applications, most of which are written in Basic.

The new CS/386 will replace all 2200s except for two low-end models, the 2200/CS 2D and 2200/CS 2N.

The 2200, Wang's first multiuser system, has an installed base of approximately 73,000. In 1972, Wang began selling the 2200s to universities and then shifted to the small-business market in the mid-1970s.

At the same time, it transferred the 2200 sales effort to resellers. In the late

1970s, Wang continued its push with resellers, particularly when the VS systems emerged as more strategic to the company, a Wang spokesman said. Today, the 2200 systems are sold exclusively through resellers.

Previous lives

The 2200 had several overhauls. Four years ago it was updated from a system with nine printed circuit boards to a single-board system. The latest version, the 2200/CS, which was repackaged to look more like a VS, was introduced in 1987.

Although based on the 80386 microprocessor, the CS/386 will not initially run the MS-DOS operating system. To maintain compatibility with older systems, Wang tailored the proprietary 2200 operating system to the new processor.

The CS/386 will begin shipping next month, a company spokesman said. Prices will range from \$7,500 to \$12,000.

EDITORIAL

Gone fishin'

IN ANNOUNCING ITS first SAA-compliant applications, IBM is like a huge trawler, setting out tantalizing lures in unsettled waters. The trawler itself is headed away from the open sea toward its own harbor, hoping to attract the big ones along with it.

The fish are wondering which way to turn. The bait is mighty tempting, and a harbor offering safe refuge from the hazards of the deep doesn't seem so bad, either.

But there is also a great allure to open waters, a promise of freedom of movement that contrasts sharply with the confines of any harbor, no matter how safe. So while few are diving for the bait, neither are they losing sight of the boat or its direction.

Perhaps one customer we spoke with said it best. Yes, the attraction of Officevision is great, but "it's all wrapped around proprietary hardware and software. You can't get around that."

Therein lies the choice that will face the big IS sites in the coming years. SAA will be anything but a panacea for those seeking to stitch together multivendor environments more effectively or for those wishing to embrace Unix strongly. But, the company says, if you are willing to play the game by its rules, IBM and its eager third-party software vendors will take really good care of you.

The SAA attractions announced to date are certainly compelling. Finally, OS/2 has a real reason for existing — namely, to provide customers with relatively seamless communications from PCs to minis to mainframes. However, this capability will come at a cost that might induce sticker shock.

Another attraction is the portability of the primary Officevision applications, such as electronic mail and calendaring, across four major hardware platforms — IBM platforms.

And a major attraction is the third-party support IBM has lined up — the same kind of support that has made the AS/400 so wildly successful in an otherwise depressed minicomputer market. These third parties, which have suffered considerably in recent years, are the most zealous SAA lovers. IBM even bought into one of them, MSA, last week, perhaps as a statement that "support" is a two-way street.

But what about open systems? Isn't that what customers have been clamoring for? Aren't they searching for the Holy Grail of enterprise systems crafted from a variety of vendors' equipment, united by industry-standard operating environments and communications software?

Given how very early it is in the SAA time frame, there are more questions than answers right now, although matters clearly bear very careful watching. IS architects will face a rising, dual chorus of cost control and systems effectiveness in the 1990s. SAA should be judged on the basis of how it alleviates the inherent conflicts between these two factors.



LETTERS TO THE EDITOR

More smoke

The article "Building blocks" [CW, April 3] describing "object-oriented programming" could not be more puzzling. Much of it reads like a traditional network database. It uses an example of an animal eating and running. How can we relate this to an insurance policy, claim or savings account? Maybe a loan entity can hop or jump?

If functionality is the key to this methodology, where, in fact, does it reside? Is it in the database engine, program or file level? How functionality fits into this diagram is beyond comprehension.

Once again, we hear implementation is transparent to the programmer through something called "encapsulation." Sounds terrific. Where's the technical explanation on how this is achieved? Sounds like more "smoke and mirrors."

"Reusable code" is mentioned. Let's hope this is not a new concept. Otherwise, we would have to exclude much of our current database technology.

It's great stuff for a vendor's glossy brochure, but too many holes make it drafty from a technical point of view.

William A. Dukacz
Senior Database Consultant
Paramount Systems, Inc.
East Hartford, Conn.

Painful problem

Douglas Barney's "Small Talk" column [CW, April 17] used a quotation that I found particularly offensive.

The quote, referenced to be from an "IS manager," tried to draw an analogy between software spreadsheets, women and

wives. To me this is a ludicrous display of sexism and the mindless attitude of "the boys" populating our industry.

As a manager in the software development industry, I have tried to understand why so many of the men in our business fail to recognize the frustration and pain inflicted on our female co-workers when comments such as this get legitimized, in print or in any way.

The only conclusion I can imagine is that *Computerworld* lacks recognition of the problem. That is a shame.

Roger S. Gourd
Pepperell, Mass.

Judging trainers

"Evaluating training vendors" [CW, April 17] is quite to the point. It is extremely important that objectives be set before, evaluated during and followed up after the instruction is given.

I would like to further highlight two points where other approaches may be attempted. The first is respect to the education material to continue to serve as a reference manual. Although I agree that any written material regarding a specific subject can serve as a reference point, I believe a more prudent approach is to actually include how to use existing reference material as part of the instruction. Typically, education material only includes "bullet items" supported by some examples. Knowing how to find more in-depth information from existing reference material therefore becomes significant for the successful use of a product.

The second point is on keeping communication lines open. We have found that scheduling review sessions for especially

technical topics in advance is extremely well-received. That is, in addition to accepting phone calls, we also return to a client site (generally a month later) and conduct an informal session where we physically review the progress the client has made to date.

In addition to helping the client, this practice also serves as a checkpoint for ourselves to be sure that we are properly presenting the material in a way that makes it possible for the attendee to successfully apply it to his job.

Loren D. Hurwitz
President
Relational Software
Solutions, Inc.
Princeton, N.J.

Open or not?

Douglas Barney's praise [CW, May 1] of Sun Microsystems, Inc.'s "openness" in licensing (for a fee) its proprietary Sparc technology, while criticizing IBM for licensing (for a fee) its proprietary Micro Channel Architecture, seems rather hypocritical. Barney apparently has not decided if licensing proprietary technology is open or proprietary. Worse than that, he applied the rules inconsistently. Either Barney must withdraw his praise of Sun, or he owes IBM an apology.

Paul A. Rostick
Computer Consultant
Philadelphia

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Is there justice for all with Judge Greene?

FREDERICK G. WITHERTON



In 1984, the Bell System was broken up, and since then, Judge Harold Greene has run it. Sometimes his rulings seem inconsistent, and he imposes many delays while deliberating over minutiae. The communications industry's ability to compete has been hindered, and users of the telephone system have suffered steadily increasing complexity without receiving compensating advantages. It's time for Greene to step aside.

A recent example of inconsistency appears in Greene's rulings on applications from two companies to participate in transoceanic cable ventures. Pacific Telesis Group wanted to join a consortium to lay a new transpacific cable; Nynex Corp. wanted to join one to lay a new transatlantic cable. Both companies are divested Bell operating companies (BOC). According to the consent decree that settled the antitrust suit and broke up AT&T, the BOCs may not undertake such ventures without permission.

After much deliberation, Greene approved Pactel's request and denied Nynex's. Apparently the distinctions were twofold. First, Nynex would have had a larger share of its consortium than Pactel.

Second, the Pactel deal supports national trade policy in opening up Japan's market, while the Nynex deal has no national policy significance.

Just a minute

There are three things wrong with this. First, no existing law or regulation specifies that BOC participation in a cable venture must be less than a certain size to be legal. Second, federal judges are not supposed to make decisions about foreign policy. Third, all BOCs will have difficulty competing internationally when every venture is delayed for months pending approval.

The National Telecommunications and Information Administration (NTIA) of the Department of Commerce recently concluded that the restrictions placed on the BOCs are having a "chilling effect" on communications research and development

and associated activity in the U.S. By prohibiting the BOCs from manufacturing, Greene's divestiture terms reduced the cash flow for R&D support to a fraction of what it was — naturally, the level has declined.

An example of Greene's minutiae can be seen in a current lawsuit. It seems Nynex fired an employee of a subsidiary called Telco Research Corp. The employee sued, claiming he had been asked to perform some consulting work that was beyond the scope permitted by the consent decree. The Justice Department took his suit to a grand jury, and Greene has been involved in hearing motions and the like.

Right or wrong, this is a trivial nuisance suit. Both Greene and the Justice Department have better things to do.

For example, on the consumer side, now the owner of every public telephone must select a preferred long-distance carrier to provide such services as charging to a credit card. These carriers may charge the caller any amount they like.

One catch

The only national-level requirement is that the carriers permit the caller to have access to his or her home carrier if the rates will be lower. Greene has said this is sufficient. But who will take the time and trouble to inquire who the carrier is and what rate will be charged?

None of this is meant to criticize Greene personally. His crafting of the original Consent Decree was a monumental accomplishment. His decisions during the succeeding five years have probably been as sensible and responsive as could be expected of any one judge. It's simply not possible to run a vast, complex, fast-changing industry from a single bench.

It's a little harder to design the best alternative. We can't put the Bell System back together again. Completely unregulated competition is not possible, either. The Federal Communications Commission used to regulate the Bell System, however well or badly. We'd probably be better off if regulatory control was returned to it.

To help the FCC function, Congress should pass new laws spelling out more clearly what competitive freedoms the BOCs have and structuring the FCC to deal expeditiously with minor cases. An increasing number of Congressmen endorse this idea and are developing legislation to remove regulation of the telecommunications industry from the courts and return it to the FCC. They deserve our support.

A 30-year veteran of the computer industry, Witherton was a vice-president at Arthur D. Little, Inc. and is now an independent consultant. He has written four books and more than 60 articles and papers.

There's no place like Tron City

CHARLES P. LECHT



A recent article in the *Japan Times* told of the efforts of Ken Sakamura, a Tokyo University professor, to create an electronic "minitown" or "intelligent neighborhood." Sakamura is the originator of the highly publicized and controversial Real Time Operating System Nucleus (Tron) project now under way in Japan.

Tron has received much publicity because its goal is so startling. It is designed to create a new computer systems architecture that will change the face of

ties that will be installed in Tron City. First, there is Tron House, which is expected to be completed by the end of 1989 in Tokyo's fashionable, high-priced and highly Westernized Nishiiazabu district.

We are told that more than 300 microprocessors and sensors are being built into the edifice to facilitate control of such mundane processes as turning on and off water, rice cookers, TV sets, videotape recorders, stereo components — you name it — all from one centralized touch panel. Once set up, Tron House will let your fingers do the controlling.

Tron House also features one of those paperless intelligent toi-

an office, carrying their heaviest packages, washing their desk areas before work and bringing tea.

We are told that flora and fauna — once found almost exclusively outdoors — will be planted in the Tron Building for their photosynthetic powers to convert the building's interior carbon-laden stench into fresh air. This is especially important in Japan, where cigarette smoking isn't going out of style by a long shot.

Now, put all this together and more — piped-in scents, automatic lighting and "Thinking Terraces" — and you have Tron City.

Future thoughts

I envisioned myself in Tron City during the year 2000 when it is slated to receive its first inhabitants. Ready to leave my office, I issue a command for a paper file, and it arrives, carried by a cheerful robot dressed like Ingrid Bergman. The robot hands me my calendar while whistling "As Time Goes By." I shut off my piped-in lilac scent and program roses for tomorrow morning. I make a reservation at the Thinking Terrace for the afternoon, thank the robot and head for my car, which greets me upon my arrival with the latest traffic information — having received inputs from the road-embedded sensors.

As I drive to my Tron Home the car takes control twice, automatically swerving to miss a stray dog and later, several beanie-capped kids who have been paralytically frozen to the pavement by their own sensor receiving devices, which were implanted in their nervous systems at birth.

I reach home and my house goes into action. Touching a panel, I set the rice cooker, instruct the bath to ready itself for my arrival, pipe in some Chanel No. 5 scent and turn on an old Liberace recording.

Before bed, I follow the dimly lit trail to my paperless toilet. I am greeted by its intelligent bowl to begin a real-time session on its heated seat.

As I leave, it supplies me with my metabolic read-out, which says I'll live through yet another night, closes its lid and plays Eine Kline Nachtmusik as I follow the dimly lit path to bed without so much as stepping on a slipper. Another day in Tron City has ended.

"I know it sounds like science fiction," Sakamura says when talking about Tron City, "but it isn't." After the Japanese technological miracle we've witnessed over the past years, we may not even be too surprised if Tron City apartment and office rentals are not already sold out.



CHRIS DEMAREST

computing for Japan. Sakamura named his minitown Tron City, and we may expect that he intends the fruits of his Tron labors to be harvested there.

Tron City will occupy an area of one square kilometer in Ichihara, a city with a population of more than 250,000 in suburban Chiba Prefecture. It will house 1,000 residents and host some 6,000 workers. According to the *Japan Times*, all private dwellings, office buildings, transportation and other public facilities will be linked through a dedicated on-line network.

Plans call for sensors to be embedded in sidewalk pavements and streets so that pedestrians, pets and motorists may move safely about without traffic lights. Presumably, devices will be installed in cars to receive inputs from the sensors. These will take over control from drivers to avert collisions as do today's aircraft collision avoidance systems.

Sakamura is currently working on several prototype facilities

that features a warm-wash spray, metabolic readouts and the decency to close the lid itself instead of relying on an inept human to do it. Tron House will also feature a dimly lit floor-based directional system to guide nighttime toilet users to the bathroom without risking breaking their shins on a misplaced chair.

Then there is the Tron Building project planned for Tokyo's high-priced central city office building district in Aoyama.

The 12-story edifice is to be equipped with 3,000 workstations that are all linked to somewhere or other through a basement control room. The building is envisioned as being semipaperless.

All electronic media filing will be possible in the basement control room's archival files. When it comes to actual paper files, the plans include robotic secretaries to file and retrieve them.

Presumably, the robotic secretary will also do all those things Japanese businessmen expect from female secretaries, such as opening and closing doors when they enter or leave

Lecht is an IDG News Service correspondent based in Tokyo.

Do IS execs need an MBA program?

READER'S PLATFORM

STEPHEN L. KOSS

It seems that in recent years MBA-bashing has become almost as popular as liberal-bashing. While this trend is not entirely without justification, a recent *Computerworld* column by Efrem Mallach [CW, May 1] arguing the irrelevance of MBA programs to information systems profes-

Koss is a managing consultant at Grant Thornton, an accounting and management consulting firm in New York.

sionals deserves a response.

First, as every MBA graduate knows, it is important to define the problem accurately. If by using the term "IS professionals" Mr. Mallach is referring to career technologists such as systems programmers, database designers or data center managers, his case is valid but trivially obvious. An MBA program certainly offers no real value to these individuals.

If on the other hand, "IS professionals" refers to application designers or developers who aspire to responsible management positions, Mr. Mallach's argument requires further consideration.

We must ask what skills are needed to be a successful IS professional and a positive contributor to an organization. Furthermore, we must ask where and how these skills should be acquired.

Not so simple

We also need to recognize that an MBA program is more than just a collection of courses. MBA programs that effectively utilize the case method teach an approach to understanding and attacking business problems.

For many students, these cases are their first exposure to problems in which

the required data is not all presented nicely before them or to which there is no single right answer. Evaluating multiple viable alternatives and dealing with ambiguity and less than complete information are skills too seldom seen in IS personnel.

In addition, the wide-ranging nature of MBA programs is a virtue, not a drawback, as Mr. Mallach contends. Knowledge of the basic principles of economics, finance, accounting, marketing and production management provides IS professionals with a flexible skills base.

It is comforting to have the knowledge base already at hand for dealing with each new systems project, regardless of whether it is a manufacturing system, an accounting system or a sales and marketing system.

Perhaps even more importantly, broad-based business knowledge is critical to understanding how an application supports the organization's operations and how it interfaces with other application systems.

For example, many IS professionals do not demonstrate even the most rudimentary comprehension of how systems such as invoicing, inventory control, purchasing or payroll should relate to their organizations' accounting systems.

Also, an MBA program provides "soft skill" perspectives that many IS professionals are sorely lacking. MBA courses create awareness of such issues as organizational theory, group behavior, personnel motivation, strategic planning, busi-

AN MBA PROGRAM is more than just a collection of courses. MBA programs that effectively utilize the case method teach an approach to understanding and attacking business problems.

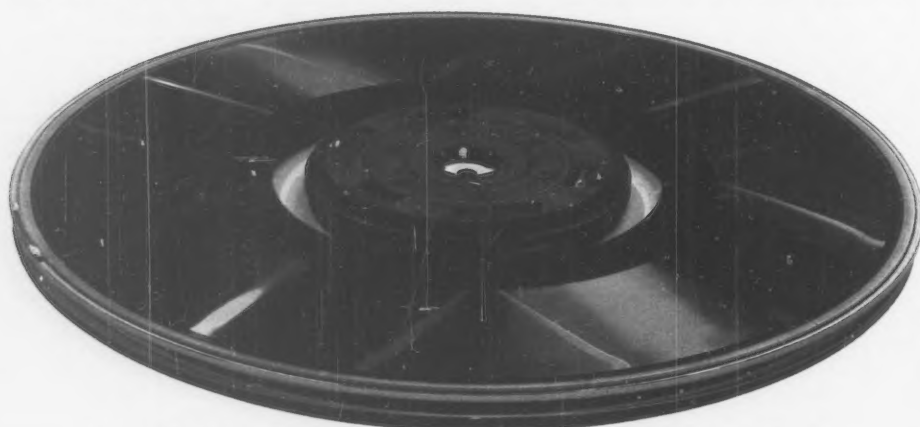
ness ethics and two other frequently absent skills: oral and written communications. All of these skills are required to some degree from every business professional who wishes to achieve a senior level of responsibility.

I submit that IS professionals with an MBA are considerably more likely to analyze systems, applications and technology with those considerations in mind than individuals with less business background. We have all met IS personnel who hardly know (or care) what their employer's business is all about, even after years with the same organization.

Senior IS professionals are increasingly being looked to as business managers, not just as technologists. The market will continue to place a premium on those individuals who can blend these two orientations to the strategic benefit of their organizations. In fact, the time may not be far off when an MBA is almost a prerequisite for a senior IS position.

From the vantage point of my 15-year career in the IS field, I would not consider for a moment giving up the knowledge and perspective that I obtained from my MBA degree. Nor do I believe that Mr. Mallach's six-course "quick fix" is the answer. Would he be equally willing to welcome into the ranks of the IS profession an MBA with a comparable six-course introduction to computer science?

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MEMO TO: M. Scott
FROM: H. Green
SUBJECT: Status Report

Mike, here's a quick update on how things have been going in your absence. I'll make it mercifully brief; after all, your vacation isn't officially over 'til Monday.

FASHION AVE
MAGAZINE



First, feast your eyes on this layout for the fall issue of FA. That's one of our new designs on the cover, as if you didn't know. Looks like our PR efforts really paid off.

More good news: our new DisplayWrite 5/2 Composer is up and running, and as you can see from this memo, calling it just a word processor is probably the understatement of the year. I think it's going to be a terrific productivity/communications tool around here.

Okay, so much for the software review. Back to business. As you probably know, it's getting to be commitment time on Project Moonrise. One of us is going to have to have a meeting with McCarthy to get the final details hammered out. The week of the 17th is about the latest we can let it go and still give ourselves enough time to complete the order. What I'd like to suggest is that you and I go as a team; that way I'll be in a position to step in and handle things if it turns out you have to go back out to the Coast. I know it looks unlikely at this point, but I think you'd ultimately feel more comfortable if we were both up to speed



Here's the fabric sales info you asked about...



One of the first sketches for the evening-wear project.

(1)

Walker, Tesseract,



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SYSTEMS & SOFTWARE

HARD TALK

James Daly

New Cray vs. Cray Classic



Several years back, Coca-Cola laid the marketing egg of the century when it introduced a new "improved" formula for its soft drink and pulled from the market the flavor that made the little sugar-water company from Atlanta a household name.

A once-unified customer base soon became embroiled in a debate that can be matched in modern times only by the ferociousness of the "Tastes Great, Less Filling" imbroglio.

Whether Cray Research's recent decision to carve Cray Computer (henceforth known as New Cray) out of the original firm (or Cray Classic) will cause the same customer split is debatable. But the move creates some very interesting and necessary dynamics for a domestic market suddenly racked with growing pains and self-doubt.

In less complex times, the supercomputing industry seemed deceptively simple: Cray made the biggest, baddest computer around and, along with fellow U.S. firm CDC, benevolently surveyed a pasture in which there were no serious challengers. But that situation

Continued on page 29

Hedging your software bets

ANALYSIS

BY AMY CORTESE
CW STAFF

Bankruptcy, mergers and acquisitions, natural disaster: They could happen to you or — just as bad — to your software supplier.

These days, most companies rely on software programs to run their business. So if a software vendor discontinues support for any reason, the customer is left without a means of maintaining the software. The costs associated with loss of support can be staggering when one considers the training, disruption of operations and even new hardware required to move to a new product.

While users have no control over acts of God or whether their suppliers remain independent, they can take steps to protect their investment in software.

The protection to which many users have turned in recent years is software escrow, which has been offered in an increasingly formal manner.

At Travelers Insurance Co., software escrow agreements are used to ensure that critical software applications can be maintained even if a vendor stops support. Lana Pantore, assistant director of corporate procurement at the insurance giant, said escrow is used when applications are critical to the firm's operations.

Software escrow is a kind of insurance policy that covers unexpected loss of support, whether due to bankruptcy or natural disaster. The source code and materials needed to ensure continued support of a program are

placed in the hands of a third party, to be released to the customer under specific, agreed-upon conditions that result in the loss of support.

Travelers has been using escrow agreements as long as it has been using software, Pantore said. However, it has been only the last four or five years in which it has been handled more professionally, she noted.

In the past, Travelers would place source code with an attorney, who, not being technically

sophisticated, would stow the media in a drawer somewhere and forget about it, Pantore recalled.

So if the software supplier stopped support, "we wouldn't know if the materials would be usable." Indeed, she said, "we might never gain access."

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Inside

- Senate offices try out Quorum system. Page 25.
- Intex Solutions announces IBM DB2 enhancement package. Page 30.

Solbourne dishes up Sparc-based servers

BY JAMES DALY
CW STAFF

LONGMONT, Colo. — Solbourne Computer, Inc. recently broadened its line of Sun Microsystems, Inc.-compatible products with the announcement of a new series of multiprocessor servers based on Sun's Scalable Processor Architecture (Sparc) chip.

Like the earlier Series 4/800 Superserver, the Series 4/530 Workgroup Server and the Series 4/670 Departmental Server are binary-compatible with the Sparcserver 300 family recently announced by Sun.

The Series 4/530 is a five-slot under-desk processor that houses either one or two Sparc processors. It provides a processing speed of up to 17 million

instructions per second (MIPS), 16M to 40M bytes of memory and up to 2.6G bytes of mass storage, according to Solbourne officials.

The Series 4/670 is a 14-slot desk-side unit that holds up to four Sparc processors for up to 30 MIPS of power. It can be configured for 16M to 80M bytes of memory and up to 2.6G bytes of small computer systems interface storage.

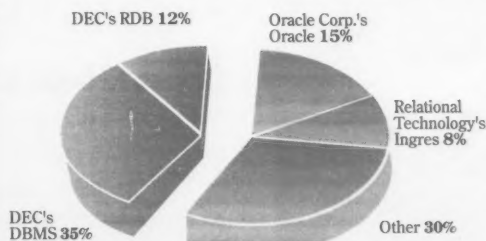
The price of the Series 4/530 models will range from \$23,200 for the uniprocessor model to \$41,550 for the dual-processor version.

The Series 4/670 line begins at \$36,700 for the uniprocessor model and runs to \$76,100 for the quadprocessor version. Both lines are scheduled to be available next month.

Data View

VAX DBMS usage

DEC's own packages make up the lion's share of commercial DBMSs used at VAX sites, but competitors are also faring well



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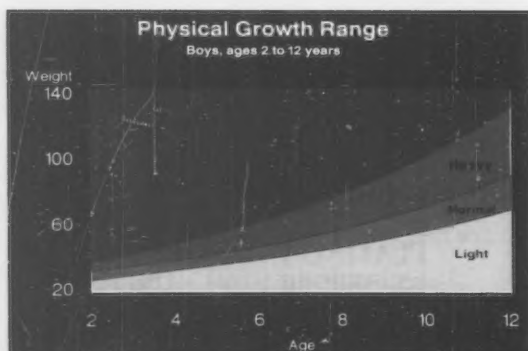
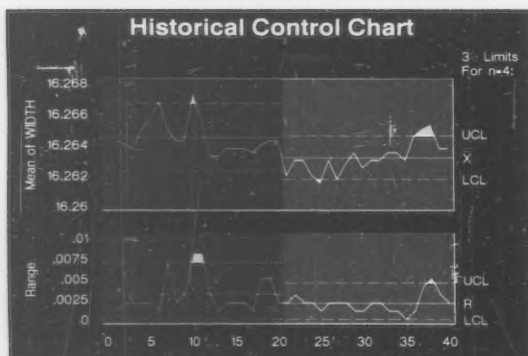
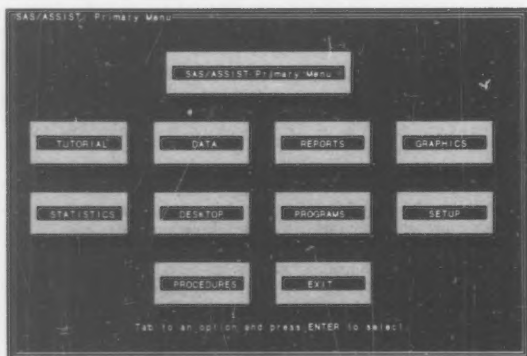
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SOFT
TALK

Stanley Gibson

Oh SAA,
can you see?

Two years after the announcement of SAA, how far along are we to its completion? Halfway?

I asked that question of SAA mastermind Earl Wheeler at IBM's recent Officevision announcement. His answer: "There's no end in sight."

That Delphic response leads to two possible interpretations. One is that Systems Application Architecture's (SAA) future is unbounded. The other is that SAA is destined never to achieve its potential. Both are partially correct.

The Officevision announcement went a long way to clarify SAA's true nature. But as that fact became more discernible, SAA's exact shape became fuzzier. Wheeler acknowledged that SAA is changing and may never achieve a final form.

SAA has been likened to a blueprint. Can an architect be working on the blueprint while the building is going up?

SAA has changed in several ways since it came into the world in 1987. Operating systems OS/400 and OS/2 were added. At first, there was to be a single common-user access (CUA); now, there are three. At first, SAA's major intent appeared to be application portability. Now it is the implementation of a client-server architecture. Wheeler and others make it clear that changes can be expected in the future as well.

But having given SAA flexibility, IBM still must keep it rigid enough to have the parts work together.

Talking with some of the developers who had their wares on display at the Officevision announcement, I found that some said their applications were not compliant with SAA's CUA in certain minor respects. This came about because their existing applications, developed for specific industries, had certain attributes that could not quite be squeezed onto the procrustean bed of SAA.

IBM did not ban them from the rollout, however, because the overall look and feel of their applications were very close to the CUA look and feel — close enough so that a user would not get confused. One of the differences, for example, was that CUA specifies no more than

Continued on page 28

Senators vote for their Pick

ON SITE

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — A small revolution is occurring in the stately halls of the U.S. Senate office buildings. Three Senate offices are using minicomputer-based office automation systems that are not on the Senate's approved list of vendors or part of the Senate's centralized computer center.

Dissatisfied with the Senate's standard systems, Sens. William L. Armstrong (R-Colo.), Max Baucus (D-Mont.) and Terry Sanford (D-N.C.) obtained waivers from the Senate Committee on Rules and Administration to select and install their own stand-alone systems.

Vickie Wimpinger, office manager for Baucus, explained that her supervisor is "really computer-literate. He wanted to be able to pull up a constituent's file and see how many times that person had written and on what subjects, as well as details such as the names of the constituent's wife and kids."

In addition, the maverick senators wanted their state offices to be linked with Washington, and they chafed at the fact that the Senate's mainframe-based correspondence management system is separate from (and incompatible with) the approved Senate office systems.

In essence, the existing system had split each senator's staff into three groups: Washington staffers who answered the mail



Baucus organizes constituent contact via Quorum system

using the correspondence system, other Washington aides who used the office system and state offices with little or no automation.

This made it impossible to keep a common database on constituents, said Howard Probst, administrative assistant to Armstrong.

The situation also led to embarrassing situations, such as a Washington staffer writing to an important constituent as though he were a stranger, unaware that the voter had dealt with the senator's state office for many years.

The senators turned to an integrated system called Quorum from Intelligent Solutions, Inc. in Falls Church, Va. "What appealed to us is that Quorum does provide a common database,"

Probst said, "where [records on] every constituent that we deal with can be accessed by everybody on our staff — and that is the fundamental need of a Senate office."

In addition to integrated tracking of correspondence and casework, Quorum can be expanded to keep track of key meetings, federal appointments, academy nominations and legislative activities, according to Probst. "The basic design of the Quorum software opens up the possibility of keeping an excellent record so you can deal with constituents on a very intelligent basis," he said.

Paul Vic, administrative assistant for Sanford, praised Quorum for its fast retrieval of constituent files by name, city or ZIP code. "If someone calls me about

a problem, I can get to their name very quickly — while they're talking — and see what their entire record is," he said.

The software also supports such applications as legislation tracking, voting records, targeted mailings, word processing, electronic mail, spreadsheets and scheduling of daily appointments.

Quorum uses Pick Systems' Pick operating system and relational database management system, running on a 32-bit minicomputer from Applied Digital Data Systems, Inc. (ADDS), a Hauppauge, N.Y.-based subsidiary of NCR Corp. The ADDS Mentor 6000 is a Pick-based version of NCR's Tower 32 line.

The system is used in 75 offices of the U.S. House of Representatives, but the vendor has modified it to meet the different needs of Senate offices, users said.

Change of heart

Initially, Baucus disliked the E-mail as well, but his aide said Intelligent Solutions immediately rewrote the software to eliminate several cumbersome steps.

The fact that many of the vendor's executives and employees are former congressional aides has been a big plus, Senate users reported, because they understand the unusual demands placed on legislative offices.

Users praised Intelligent Solutions for being responsive to customer suggestions and for providing prompt service and excellent training. "There were people from Quorum here for the first three months [after installation] who did nothing but sit in our office to help us," Wimpinger said.

RTI to spit-and-polish
Ingres DBMS productBY AMY CORTESE
and PATRICK WAURZYNIAK
CW STAFF

Seeking to boost its reputation as a leading tools supplier, Relational Technology, Inc. this summer will introduce another release of its Ingres relational database management system aimed at the professional application developer.

RTI's development tools have received endorsements from several computer manufacturers, including Digital Equipment Corp. and Tandem Computers, Inc., which both resell Ingres tools with their proprietary DBMSs.

Ingres Release 6.2 enhances the tool set and features Open SQL — a version of the standard SQL — replacing Quel, RTI's proprietary language. The major enhancements in Release 6.2

add functionality to the applications-by-forms development environment and Ingres' fourth-generation language (4GL).

This release follows on the heels of a major rewrite of the Ingres DBMS last year, undertaken to make its design more modular and to support high-performance transaction processing.

The Ingres tools were enhanced to help the professional developer speed delivery of software applications. RTI's tool strategy aims to combine the advantages of both third- and fourth-generation languages to provide early prototyping and testing of applications with the power of 3GLs.

To accomplish this, the release integrates 3GL environments tightly with 4GLs. A developer can directly call 3GL routines written in Cobol or For-

tran from the 4GL, as well as invoke and use the 4GL from a 3GL environment without having to exit.

Additionally, a 4GL interpreter has been added for rapid prototyping and testing to complement the compiled 4GL used during deployment. Partially completed applications can now be tested and deployed without waiting for the full application, according to RTI.

Booster shot

The applications-by-forms development environment, which connects all Ingres tools, has been given a new productivity-boosting interface, replacing many keystrokes with function keys for faster development.

All application objects are stored in the Ingres Data Dictionary. Despite an agreement with DEC to jointly develop and market Ingres Tools for the VAX, Ingres is not integrated with DEC's CDD Plus Data Dictionary. Instead, RTI said it is following the Information Resource Directory Standard, an evolving dictionary standard, as

a possible way to work with various DBMS dictionaries.

The dictionary has been enhanced in the latest release to enable information from it to be printed out on hard copy.

Release 6.2 is scheduled for shipment June 30 for DEC VMS environments and will be available on Sun Microsystems, Inc. and other platforms in the future.

RTI plans more enhancements to be announced during the next six to 15 months. Notable among those will be Windows/4GL, an extension of the 4GL that will allow multiple graphical user interfaces to be supported. Through use of a high-level syntax, programmers will not have to be concerned with which interface they are writing for, a tremendous problem for developers.

Also in store are "triggers" for the Ingres DBMS, which would let business rules be programmed into the database to automatically trigger action when a specified event occurs, and an object-oriented forms system.

Hedging

FROM PAGE 23

Today, Travelers uses Data Securities International, Inc. (DSI), a San Francisco-based firm that has been a pioneer in the area of technology escrow. Pantore said that with DSI, an agreement requiring the vendor to provide updates and an envi-

ronmentally protected storage area assure that the deposit will be useful if and when released. Also, DSI has technically trained staff who inspect and verify the contents of the deposit.

Pantore said that she is more comfortable doing business with a small vendor — companies that often have the most innovative products — if she knows Travelers has access to the

source code if needed.

Dick Verville, director of business and product development at LFE Corp. in Clinton, Mass., said his firm started using escrow last year. LFE, which manufactures industrial display instruments, licensed software in 1988 to bundle with a display product it sells. The escrow agreement calls for the source code and subsequent enhance-

ments to be deposited with a third party and released to LFE in the event that the supplier cannot provide support. "We're buying assurances for the future," Verville said.

More than anything, escrow gives companies control over an unexpected situation, whether a company decides to maintain the product itself or just buy time while evaluating alternatives. "If

the rug gets pulled out from under your feet, you have time to go about it in an orderly fashion," said John Noerr, president of DSI. While DSI has been in business for several years, it has needed to release software code only 10 times. In each case, the firm decided to continue using and maintaining the software.

Caution need not be applied only to small companies. Large companies are likely to phase out mature products, according to Noerr.

For instance, in 1987, as part of a strategy to focus on IBM and Digital Equipment Corp. platforms, McCormack & Dodge Corp. discontinued support of its accounting software for the Hewlett-Packard Co. HP 3000, suggesting those customers migrate to IBM computers. The same year, Computer Associates International, Inc. dropped support of a mainframe scheduling package acquired from Uccel Corp. Uccel in turn had acquired the software — a package that competed directly with one of its own — from Cambridge Systems Group, Inc.

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According to John Noerr, president of Data Securities International, Inc., these four simple steps can help you determine your risk:

- Assess the importance of your software applications and the business' dependency on them. Is it unique and not available from another source? Is use of the application increasing? Does the software support your customers, so that loss of support could mean a damaged image as well as lost time?
- Assess the probability of the software developer's failure to provide support. Is the company a candidate for a takeover? Does it have high staff turnover? Is the product still actively marketed and enhanced? Is the company a small firm or a start-up?
- Quantify the potential loss and financial impact to the firm as a result of discontinued support of an application.
- Weigh the estimated risk in comparison with the cost of an escrow agreement.

May 16, 1989

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For more information on what IBI is doing to achieve SAA compliant products, send for our free SAA Implementation Kit. Write to Information Builders, 1250 Broadway, New York, NY 10001, or call (212) 736-4433, Ext. 3700.

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Information Builders, Inc.



HARD BITS

Interleaf sells from HP platform

Hewlett-Packard Co. and Interleaf Corp. have announced a deal that will allow Interleaf to sell its technical publishing software on the HP workstation platform.

Interleaf plans to begin selling its system on the HP 9000 Series 300 in the fall.

ries 300 in the fall.

Tandem Computers, Inc. said it has an agreement with Information Builders, Inc. to develop and sell Focus, Information Builders' fourth-generation language database tool, for use

with Tandem's Nonstop SQL relational database management software.

Meanwhile, Volt Delta Resources, Inc., a subsidiary of Volt Information Sciences, Inc., signed an agreement with Tandem to act as a systems inte-

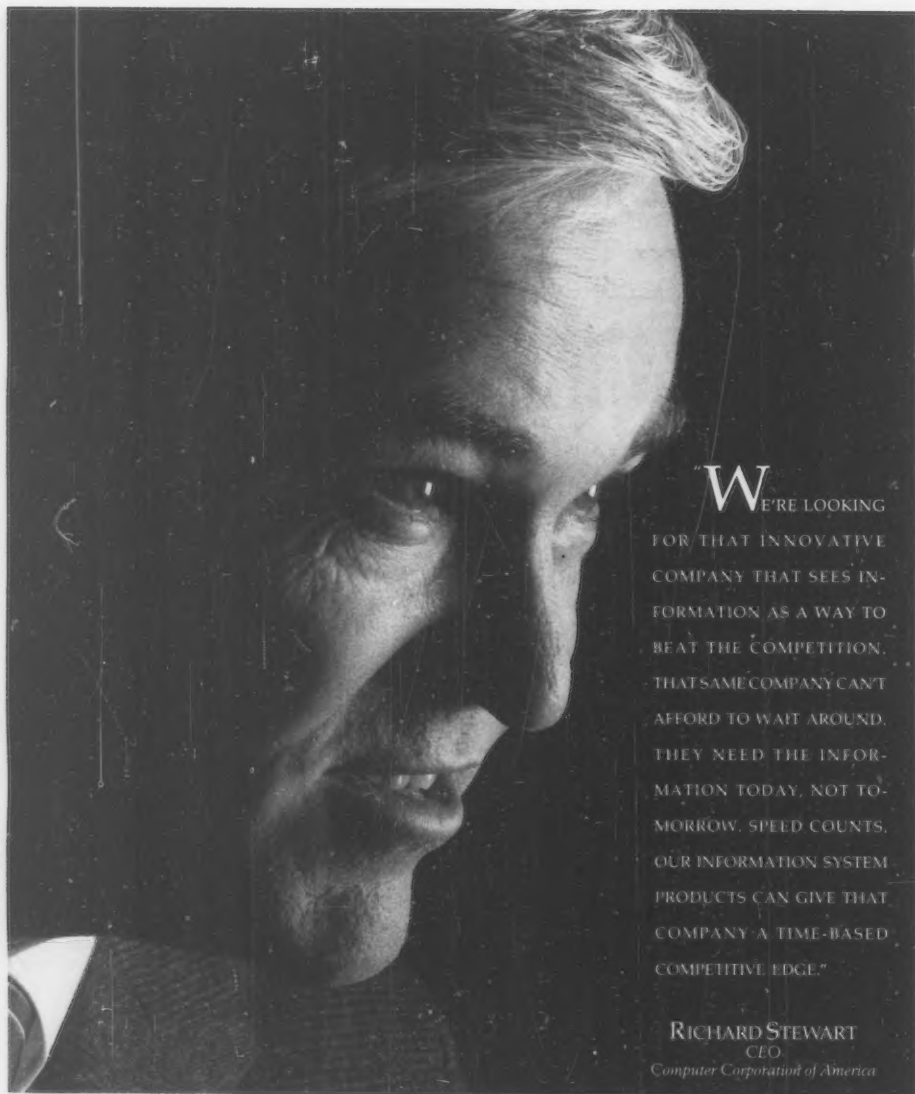
grator for the Tandem Nonstop systems. Volt Delta will aim at telecommunications firms in selling Tandem-based systems tailored for such functions as directory assistance and listing services.

Control Data Corp. in Minneapolis added an environmental monitoring component to the Proact Program, its service

package for Digital Equipment Corp. VAX computers.

The latest addition provides software and sensors that monitor conditions in a computer room, including temperature and humidity.

Customers can predefine parameters for an appropriate environment, and the software will automatically alert users of the existence of a problem situation.



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RICHARD STEWART
CEO
Computer Corporation of America

COMPUTER CORPORATION OF AMERICA

Information Advantage Today.

617-492-8860

Gibson

FROM PAGE 25

seven pull-down menus. One vendor had eight. A minor deviation, perhaps, but these were anointed vendors, and this was SAA's coming-out party. What would happen if an unanointed third party came up with a larger deviation and claimed SAA compliance nonetheless?

This is an issue that has some IBMers racking their brains. There are two camps at IBM on the issue of SAA compliance. One camp says IBM must test third-party software for SAA compliance. The other holds that such testing is difficult, costly and bound to cause problems among third-party software vendors, which may disagree with the results.

The solution for now is a sort of SAA report card. This comes with a color-coded booklet that IBM says all prospective SAA customers should ask their vendor to produce. There are boxes to be checked off in a number of different categories. Not all boxes need to be checked off for a vendor to make some kind of SAA conformity claim.

Users will have to become closely aware of a number of SAA categories and their particular significance to them. In CUA compliance, a vendor may check either CUA 1987 or CUA 1989. Wheeler said he expects there will be a CUA 1990.

But this report card may not be the final answer. Wheeler intimated that IBM may yet go further in asserting SAA compliance. He did not elaborate, but the implication was something more than a loose vendor self-evaluation. Maybe testing in some form will be done.

As of now, it is up to the user to keep up with SAA changes and make sure vendors do not stretch their claims of compliance. But users are faced with the annoying possibility that choosing between the different varieties and vintages of SAA could soon become more complicated than choosing a French wine. Further, the SAA criteria could be about as understandable to users as a French wine label is to English speakers. IBM may have to assert some "Appellation Controllee" standards.

Gibson is *Computerworld's* senior editor, software.

Daly

FROM PAGE 23

is now ancient history. CDC's supercomputer subsidiary ETA Systems folded its tents last month, leaving Cray as the lone eagle on a technological front that has become increasingly important to both defense and manufacturing systems.

In the meantime, Japanese firms such as Hitachi, Fujitsu and NEC are not only catching up with but actually surpassing Cray in both price and performance.

Chairman John Rollwagen's decision to hedge his bets and divide the company along technological borders makes a lot of sense — except, perhaps, for the fact that the company producing computers is known as Cray Research while the one doing research is called Cray Computer.

The Internal Revenue Service willing, New Cray will emerge from the experimental gallium arsenide chip technology now being developed by Seymour Cray & Co. at the Cray-3

THE BIRTH of New Cray must certainly rank as one of the most promising start-ups in the industry.

laboratories in Colorado, while Cray Classic will expand on its highly successful silicon-based line.

In other words, New Cray will try to represent the future while Cray Classic aims to address the present.

The only thing staining the announcement was Rollwagen's claim that he has created a competitive American supercomputer industry with the stroke of a pen. If one player controls both the black and white pieces on a chessboard, does that count as competition?

But the positives far outweigh Rollwagen's gaffe. While only the great supercomputer god in the sky knows whether gallium arsenide will be a boom or bust, the birth of New Cray must certainly rank as one of the most promising start-ups in the industry.

The move marks the third time that Seymour Cray has been present at the birth of a new supercomputing venture: Before launching Cray Classic in 1972, he was one of the founding fathers of CDC in 1957.

Beyond that, however, some fundamental questions still must be answered if both companies — and the U.S. supercomputing effort that they now represent in microcosm — are going to re-

main viable.

First, the Cray-3 development program has hit some unexpected snags, which have been linked to anything from problems in the uniformity of gallium arsenide crystals to glitches in the cooling system. Both investors and customers need to be leveled with before any confidence comes the way of New Cray.

Additionally, what of Cray's plans in parallel processing? Although a massively parallel architecture would be a radical departure from current architectures, there are some customers who believe that it is the only solution for providing the power they'll eventually need.

On the other end, will Cray Classic pay more attention to the

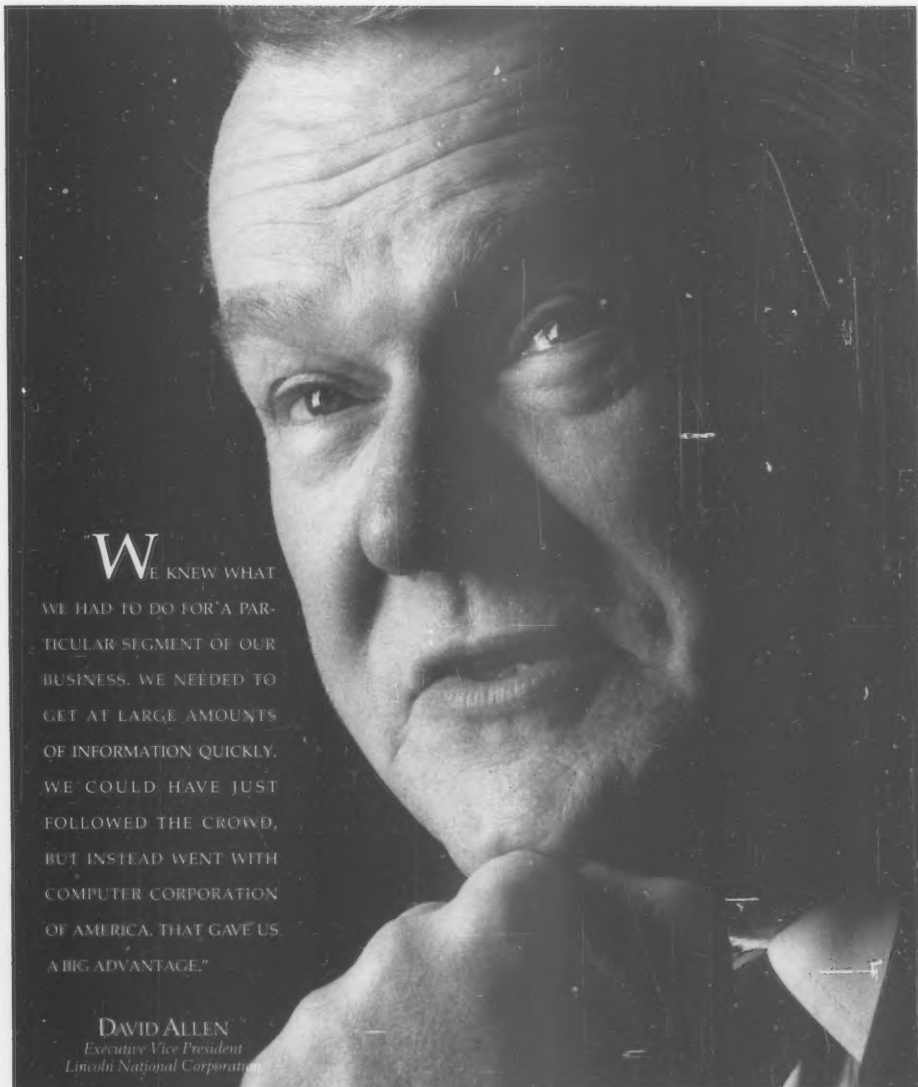
low end? With companies like IBM feeding on users who desire near-supercomputer performance but don't want to pay the price, there's apparently plenty of demand for a scaled-down Y-MP.

There's also the question of security. Some customers claim that Cray software isn't as secure as it should be. A National Computer Security stamp may

be in order.

With that in mind, it's time to sit back and see if a lanky and soft-spoken Minnesotan can once again set the outer limits of the supercomputer industry on its ear. Then, as is customary, the customer can decide which supercomputer is The Real Thing.

Daly is a *Computerworld* senior writer.



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NEW PRODUCTS — SOFTWARE

Database management systems

Intex Solutions, Inc. has released a software product developed specifically to enhance IBM's DB2 relational database system.

Called SQL:Attach, the program is targeted at database administrators, application managers and other DB2 users running batch jobs against their databases. The software makes it possible to run the batch job natively and is compatible with DB2 Version 1, Release 2 or later, the company said. License fees are scaled ac-

cording to CPU size, starting at \$6,000 for a perpetual license.

Intex Solutions
161 Highland Ave.
Needham, Mass. 02194
617-449-6222

Languages

Michaels, Ross and Cole Ltd. has announced Release 1.2 of the MRC-Productivity series, a fourth-generation language that reportedly converts SQL into an end-user tool.

The software series is a report-writing and applications development tool for end

users and programmers, the company said, and the latest release was developed especially for the IBM Application System/400 platform.

Pricing ranges from \$5,000 for the Application System/400 B10 to \$39,500 for the Model B70.

Michaels, Ross and Cole
Suite 203
450 E. 22nd St.
Lombard, Ill. 60148
312-916-0662

Applications packages

Information Builders, Inc., designer of the Focus fourth-generation language and database management system, has announced Release 4.0 of Focman, a Focus-

based project management system.

According to the vendor, the latest release contains on-line context-sensitive help for all input fields. The software package now offers support for parallel scheduling and includes time-sheet and data analysis capabilities. Focman runs under IBM's VM/CMS and MVS/TSO operating systems, as well as in the Digital Equipment Corp. VAX/VMS environment. Pricing starts at \$6,000, depending on machine size and configuration.

Information Builders
1250 Broadway
New York, N.Y. 10001
212-736-4433

An integrated asset-management software system for large financial institutions has been announced by National Computer Systems, Inc.

The Ultrast System was designed for domestic and international financial institutions, as well as those heavily involved with foreign investment transactions, the company said. The software package reportedly provides full-accrual double-entry accounting, trade-date accounting at the time of execution and multicurrency investment processing capabilities. It runs on Digital Equipment Corp. VAX/VMS systems and is priced from \$1.5 million.

National Computer Systems
400 Northridge Road
Atlanta, Ga. 30350
404-641-4100

Utilities

Legent Corp. recently enhanced its direct-access storage device (DASD) performance manager for IBM MVS systems.

Dasdmon Release 2.0 automatically uncovers and analyzes I/O problems, recommends solutions and provides utilities, according to the vendor.

New features reportedly include the Online Performance Expert, designed to solve on-line DASD performance problems, and the Batch Performance Expert, designed to provide solutions to problems that occur consistently over a period of time.

Pricing for Dasdmon Release 2.0 begins at \$10,000, depending on CPU configuration.

Legent
2 Allegheny Center
Pittsburgh, Pa. 15212
412-323-2600

H & A Computer Services, Inc. has introduced several migration products and services designed to allow IBM Series/1 users to move programs and data to the IBM AIX environment.

The products include an EDX/AIX emulator shell written in C that allows Series/1 users to emulate EDX running on the Series/1.

Pricing ranges from \$990 to \$2,450, depending on modules and volumes, the vendor said.

H & A Computer is also offering a source code analyzer, an EDL-to-C translator and a tape transfer facility.

Pricing starts at \$300 for the software package, and volume discounts and corporate licenses are available, the company said.

H & A Computer Services
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San Francisco, Calif. 94111
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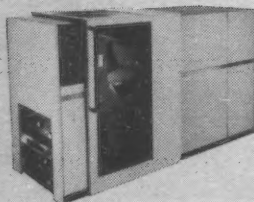
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Mary V. Gracy
Vice President
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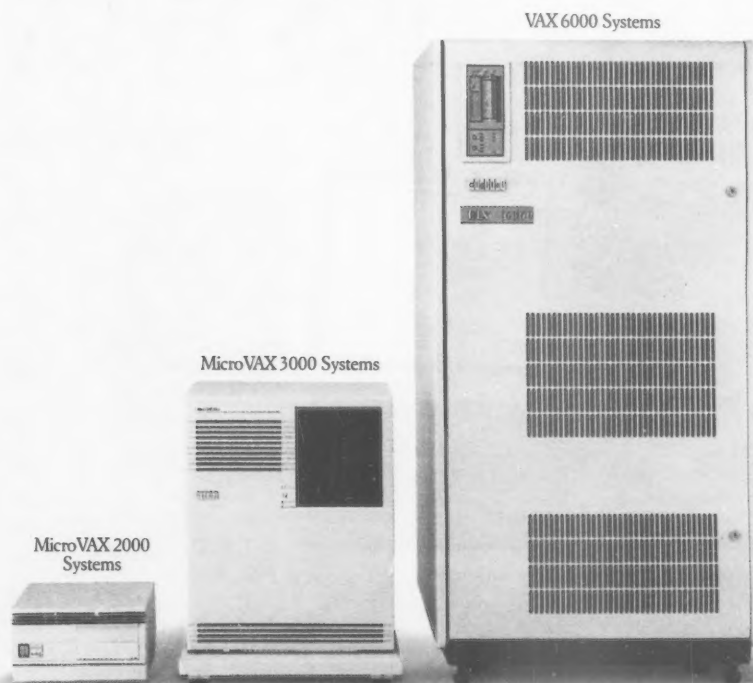
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WYSE

PCs & WORKSTATIONS

MICRO BITS

Michael Alexander

Get out those picket signs



It's the 1960s all over again. At least that's what came to mind when I received a fax early last week from an outfit called the League for Programming Freedom. This group of "prominent computer-science professors, computer-science students, software developers and users . . . [planned] to picket Lotus Development Corporation headquarters . . . to protest litigation on computer user-interface copyright," according to the fax announcement.

If the look-and-feel controversy wasn't such a crucial issue, this grass roots effort would be a riot.

The protest, organized by such much-respected computer scientists as Marvin Minsky, founder of MIT's Artificial Intelligence Laboratory, and Rich-

Continued on page 39

Inside

- Salomon Brothers creates pilot SQL program. Page 37.
- Olsen discusses workstation's future. Page 37.
- Compaq, IBM cut memory prices. Page 39.

IBM gives OS/2-fold boost

BY DOUGLAS BARNEY
CW STAFF

NEW YORK — Hardly anyone is using either of them, but that has not stopped IBM from updating its OS/2 and OS/2 Extended Edition operating systems.

OS/2 Standard Edition 1.2, announced earlier this month and scheduled to ship by the end of September, has been dramatically enhanced. It features a new optional file system that can handle up to 16 disk partitions. Gone is the arbitrary 32M-byte limit on hard disk partitions; now, individual volumes can grow as large as 2G bytes.

The new Dialog Manager is designed to conform to IBM Systems Application Architecture interface guidelines and is intended to help the end user in-

Take/2

OS/2 Standard and Extended Editions are recast with fresh features and functions

OS/2 Standard Edition 1.2

- SAA Dialog Manager
- Iconic manipulation of files and programs
- High-performance file system

OS/2 Extended Edition 1.2

- Remote data services
- Referential integrity
- DOS database requester
- Support for Cobol, Pascal, Fortran

CW CHART: DOREEN DAHLE

teract with the application.

The OS/2 user interface will allow programs, including DOS,

to be represented as icons and invoked with a simple mouse click. Files can also be represented as icons. The OS/2 Standard Edition price remains at \$340. Current users can upgrade to the new version free of charge.

OS/2 Extended Edition, which lies at the center of IBM's new Officevision strategy, will receive many previously announced enhancements when it ships in November.

The most visible change to the Database Manager is in the Query Manager, which will exploit the OS/2 Presentation Manager. Now queries and reports can be performed with the help of icons and other graphical tools. "Our use of the Presentation Manager will buy a lot of usability improvement," said Julie Powell, database product plan-

ning manager at IBM's Entry Systems Division.

Particularly critical is Remote Data Services, which allows multiple workstations to access a common OS/2 Extended database. Individual personal computers can now work cooperatively with OS/2 Extended back-end servers. Users do not need to know where the database is located, Powell said.

IBM also added referential integrity to the Database Manager. This allows data values between related columns of different tables to remain consistent. Application programmers will no longer need to add referential integrity logic to their programs.

By adding support for Cobol and Fortran, developers can embed SQL statements within their programs. This allows programs to query an OS/2 Extended database directly. Current users can upgrade free of charge.

From college life to insurance: What Next?

BY WILLIAM BRANDEL
CW STAFF

NEW YORK — First it was a computer for college students. Then Businessland, Inc. announced that it would distribute Next, Inc.'s machine through its market channels. Now Next is being reviewed at New York Life Insurance Co., and its implementation may finally reveal the carbon-black box's true colors.

"It's the new toy at our site," said Richard Nelson, vice-presi-

dent of the New York-based concern's information systems and services department. "Now all we have to do is find a practical use for it in our environment."

Although New York Life has only one Next machine on-site, it is being given serious examination by Nelson's IS staff. Last week, New York Life performed a demonstration of the machine for its executives and department heads.

Nelson will evaluate the intuitiveness of the machine's user

interface and other aspects, such as whether users can easily integrate mainframe- or microcomputer-generated text. In addition to exploring these and other Apple Macintosh-like attributes, Nelson plans to test the voice technology in New York Life applications.

Practical machine

Initially attracted to the machine's presentation graphics and easy-to-use features, Nelson said he also believes the machine — built by Steve Jobs, Apple Computer, Inc. co-founder and chairman and president of Next, Inc. — could be a practical solution for users at any level of the insurance company.

"You don't have to be a tech-

nical guru or even know DOS commands to do something like merge files," Nelson said. "Most of our users don't want to know what the machine is doing; they just want the machine to perform the function."

The sleek machine's ease of use also makes it an ideal executive information system, Nelson added. He said the easy-to-use icon-oriented user interface complements the text management features, which are well suited to an insurance company.

"You can just imagine what it is like for someone to find a specific procedure related to an individual case," Nelson said. But with the Next machine, he said, point, click — the procedure is found.

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continued on following page

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SMALL
TALK

Douglas Barney

Bill Gates,
superstar

This ain't no disco. The mood was about as electric as it gets in the highbrow community of

Wellesley, Mass. Those who crowded the auditorium were jittery and anxious. All seats faced a large white screen waiting to be filled with color and movement, which was occasionally obscured as stagehands whipped past to adjust a microphone.

The buzzing was not over Frank Sinatra, a Broadway play or Guns and Roses. Nay, nay: These were computer heads waiting for Bill Gates, the most famous, revered and wealthy PC whiz of all.

To members of the Boston Computer Society, who recently invited the well-heeled Microsoft chairman to speak, this was indeed a special day. To the innocent bystander, such glory for a computer programmer was strange, a bit like attending a rock concert for propellerheads.

But for the hard-core programmers in the audience, Gates stood as a symbol of hope, that one can do quite well just cranking out code. For customers, Gates is the guy who helped build a lot of the stuff in use today.

After what seemed like endless delays, the evening began. The lights in the room went

Continued on page 38

Salomon banks on SQL Servers

Multimillion-dollar deal with Sybase will launch distributed platform

ON SITE

BY PATRICK WAURZYNIAK
CW STAFF

NEW YORK — During the next year, Salomon Brothers will begin piecing together the Wall Street financial firm's future distributed computing platform, to be founded on the Sybase SQL Server.

Salomon, which recently inked a multimillion-dollar contract with relational database management system vendor Sybase, Inc., is implementing a pilot program that will eventually place more than 100 SQL Servers throughout Salomon on various Unix platforms, including dozens of new workstations and database servers.

Before deciding to use Sybase, the firm evaluated relational databases from Oracle Corp. and Relational Technology, Inc.

Salomon plans to build a variety of applications in such areas as foreign exchange, fixed income and equity trading.

Salomon looked at the relational database industry as a whole before choosing Sybase, said Emily Suskind, a vice-president of Salomon's business technology organization and head of the data architecture group responsible for implementing the database pilot program.

Chosen for distribution

Suskind, who called Sybase's SQL Server "the key to our move to distribute our systems," said Sybase's database was chosen for its distributed capabilities and the vendor's support.

"We felt that they had a very clean product architecture and that they had a very clear vision of how they wanted to evolve their product line," Suskind said.

"They also had a clear vision of how they would fit into our environment and how their technology is going to fit with other technologies in the marketplace over the next 10 years."

If all goes well with the pilot program, Salomon probably will supplement its IBM mainframe and Prime Computer, Inc. minicomputer environments with a large number of workstations, primarily from Sun Microsystems, Inc., as well as IBM's RT family.

In recent years, Salomon built several applications that not all computer users can access on its older systems. Needing a boost in productivity, the company decided to build a new database system with Sybase rather than continue to expand with the older, incompatible existing databases on IBM 3090 mainframes and Prime minicomputers.

"One of the reasons we went

with a new data architecture was the fact that we've had a huge product explosion in our industry over the past five to 10 years," said John Galante, senior vice-president at Salomon's business technology organization.

Salomon's minicomputer databases, running under Primos, are used for analysis and decision support. The IMS and DB2 databases on its IBM mainframes, which handle all of the firm's basic transactions, do not talk to the Prime systems, Galante noted.

High cost of data

In addition, Salomon's development group had to deal with the high costs associated with maintaining existing databases.

"Our business is primarily an information business, so we thought it was time to come up with a new strategy for managing data," Galante said, adding that the creation of a new database with Sybase will make more data much more accessible to a larger number of users.

"Our sales, trading and re-

Continued on page 38

Olsen sees workstation revolution

BY JAMES DALY
CW STAFF

BOSTON — Declaring that the days of the lone worker frittering away hours on a problem are numbered, Digital Equipment Corp. President Ken Olsen predicted earlier this month that the interactive workstation market will not only stretch the boundaries of the industry but also dramatically affect the way users work.

"In most organizations, there is a tendency for secrecy because we don't like to share data," Olsen said during his keynote address to the Engineering Workstations Conference here.

"But the major contribution of the workstation is the teamwork it encourages in getting people

to work together on the same problem."

The workstation field has been one of the most hard-fought battlegrounds in the industry during the past year. Major introductions have arrived from DEC, Sun Microsystems, Inc., Apollo Computer, Inc. and Data General Corp., with each claiming to leapfrog the others' price/performance value.

But Olsen said this war of numbers is ultimately meaningless. "Things will always get faster, but it's how we work together that counts," he said during the 35-minute speech.

DEC's efforts may already be paying off. A recent report pub-

lished by research firm Computer Intelligence in La Jolla, Calif., claims that the introduction of the Decstation 3100 in January has gone a long way in helping DEC make significant gains against both Sun and Apollo. DEC now holds 32% of planned workstation purchases, compared with 18% for Apollo and 33% for Sun.

Olsen said important contributions are expected in the software end of the workstation market because workers will want sophisticated products to interact on the same database so that they can compare old work with new.

Also, Olsen said he does not see any Japanese firms challenging the dominance of U.S. workstation firms.



DEC's Olsen declares the end of the lone problem-solver

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Barney

CONTINUED FROM PAGE 37

dark, and a demo of the latest version of Microsoft Word came up on screen. Oy, not a demo! But unlike this observer, these technophiles were quite content. In fact, people spontaneously applauded twice after seeing particularly snazzy features. Imagine applauding a product demonstration, and a word processor at that. I guess that is what you would call Microsoft magic.

Finally, Gates took to the mike. With the buildup, you almost expected him to break out into song or dance. Instead he went patiently through a list of questions and answered each in his own diligent,

technically competent but not always satisfactory manner.

Quite often, Gates would say things that were hilarious to those of us steeped in the computer business. For instance, Gates drew howls when he earnestly suggested that Lotus Chairman Jim P. Manzi learn to program in C. That line would not go over big at the local comedy club.

The reception given to Gates, and the pedestal upon which he has been placed, says a lot about our industry. Gone are the days when all computers were mainframes and only MIS got to touch them. Today computers are everywhere, and the people who make the stuff are famous. The man on the street may not know Cobol, but he probably knows Steve

Jobs, Mitch Kapor and Bill Gates.

That's great for the new computer celebrities, but I'm not so sure it is great for customers. The reason many are so fascinated with Gates is that he has the industry by its disk drives. He controls, to a large extent, what we buy, use and sometimes curse at. It may be that too much power is concentrated at the top, with customers' views often overlooked while young geniuses search for new levels of software functionality.

After more than an hour, the session wound down, and I almost expected the audience to brandish lit matches, hoping for an encore. At least half the audience settled on a standing ovation. One gentleman leapt about four feet onto the stage to beseech Gates for an autograph.

Gates obliged, then shielded by two associates, beat a retreat. I left shaking my head.

So what did he say? Though those expecting a blockbuster revelation were disappointed, Gates did let a few precious facts slip out. Yes, Microsoft is working on new versions of MS-DOS, and MS-DOS 5.0 should be smaller and faster. Yes, MS-DOS 4.0 bugs are fixed, and yes, some of the blame lies on Microsoft's shoulders.

Yes, within "a few years," OS/2 will run on reduced instruction set computing machines. Microsoft is currently rewriting the assembly language portions of OS/2 in C to gain portability.

Gates also said that the Intel 586 will have the same architecture as the 386 and 486, so do not expect any specific 586 systems software.

Regarding the Apple suit, the worst outcome Gates could bring himself to think of involves making minor changes to the appearance of Windows. "In the absolute worst case, a few pixels go to sleep," Gates said.

Notes notes. Notes, an idea-sharing, kibitzing kind of product from Lotus that has yet to ship, is on the move. The product is just now going into early beta testing and should be out this year. The system is aimed to run on an OS/2 server, with workstations operating under the OS/2 Presentation Manager. Most of the work has been done under Microsoft Windows, but it is unclear whether a Windows version will ever appear.

Recent additions to this groupware product include access to a greater number of file structures such as an interface to Lotus' Agenda. Lotus sources said that Notes will be able to dynamically share data when it is finally released.

Barney is a *Computerworld* senior editor, PCs & workstations.

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Salomon

CONTINUED FROM PAGE 37

search groups had inefficient access to this information," he said. "Basically, we needed better productivity out of both environments. It was very costly for us to maintain all of the various databases."

Over time, Salomon will migrate many of the applications to the SQL Servers, which eventually will replace the mini-computers and perhaps more. In the meantime, Salomon plans to add workstations and a Pyramid Technology Corp. database server.

"We're taking a bottoms-up approach, taking specific product areas to work with first," said Galante, who said that although Salomon could be off its Prime databases by 1990, migration off the IMS mainframe databases may take much longer, if it is ever done.

"We're not sure we're ever going to be completely off the mainframes because we have so much [data] there," Galante said.

"We're first attacking the decision support and the front-end transaction processing, and then I think we're looking at how much of the back-end clearance function we can attack using Sybase," he continued. "The key to our decision is primarily where is it most cost-effective to use the new technology."

IBM, Compaq slice byte prices

BY WILLIAM BRANDEL
CW STAFF

Although their intentions differ, IBM and Compaq Computer Corp. have both broken with tradition and given their customers what they could only dream about before — lower prices.

IBM struck first two weeks ago, announcing that customers who purchase memory products from them by Dec. 31 will receive a limited rebate. In a move that industry observers said was a recognition that OS/2 needs all the help it can get, IBM is also offering rebates as incentives for users to buy OS/2 applications.

IBM officials said they hope discounted memory products will help squash the argument that customers are not moving to OS/2 because its applications, such as Presentation Manager, are too memory-consuming and too expensive. IBM officials frankly stated that they are disappointed with the memory-hogging operating system's meager acceptance and are trying to lure users off the fence.

Compaq one-upped IBM last week by lowering the price of its memory products by \$100 in lieu of a temporary rebate. Compaq officials cited loosening memory chip supply as sufficient reason to pass on the savings to customers.

Compaq also lowered the price on some storage devices — for example, the 40M-byte fixed disk drive dropped from \$1,399 to \$899.

Not lured to OS/2

Some information systems managers said that neither move will affect their IS strategy or lure them into OS/2, but they enjoy the idea of lower prices and can only hope for more. "It certainly doesn't hurt," one IS director said. Analysts cast a wary eye on the IBM move, calling the OS/2 and memory rebates more of a distress signal than an incentive.

IBM customers who purchase OS/2 Standard Edition and up to a maximum of 4M bytes of memory will be refunded \$100 per megabyte. OS/2 Extended Edi-

tion buyers will receive a \$200 per megabyte refund for up to 4M bytes, and OS/2 LAN Server customers will receive a \$200 rebate for purchasing up to a maximum of 8M bytes of memory. These rebates are available on an array of IBM memory add-in products.

Compaq lowered the price of its memory products across the board by \$100 per megabyte.

IBM also announced rebates on a plethora of OS/2 applications, including a \$100 rebate on Borland International's Paradox OS/2; a \$200 rebate for Information Builders, Inc.'s PC/Focus for OS/2; a \$50 rebate for Informix Software, Inc.'s 4GL; a \$50 rebate on Lotus Development Corp.'s Agenda; and a \$100 rebate for Micrografx, Inc.'s Micrografx Designer.

Alexander

CONTINUED FROM PAGE 33

ard Stallman, a top hacker and developer of Emacs, a widely used programming editor, is aimed at Lotus, Apple, Ashton-Tate and other firms that aim to copyright the look and feel of their user interfaces.

The notion that a user interface can be protected under copyright law is as absurd as trying to copyright the steering wheel and placement of pedals in an automobile, Stallman said via fax. "Drivers would have to learn a different user interface for each car, which would result in havoc on the road," he asserted. "Similarly, software user-interface copyrights will burden users with gratuitous incompatibilities and software developers with obnoxious lawsuits — unless public opinion turns decisively against it."

Lotus, however, seemed little perturbed by the visit of the league of protesting programmers. I spoke to Heidi Sinclair, the company's corporate communications czar, to find out whether the company would be manning the barricades the afternoon of the protest. "These are not the students in Beijing," she laughed. "As far as we can tell, it will be a handful of academics. It's more of a throwback to the '60s."

Lotus thinks that software programmers should get paid for their creations. The protesters, most of whom are academics, have little understanding of how the real world functions, Sinclair said.

There has to be a common ground between the picket signs and the company's front doors. Put aside trying to decide whether Lotus, et al, can actually copyright user interfaces that were based on the work of others. Put aside trying to decide whether academicians understand the needs of business. If Lotus, Apple, Ashton-Tate and other litigants succeed, it will be bad for business and end users. The big firms will become bigger, overshadowing smaller, more innovative competitors.

It's doubtful that the legal system will be able to come up with a solution that equally applies to both creative expression of an interface and the actual implementation of that idea. Nevertheless, the software industry is willing to allow the courts to decide whose products should be marketed. You have to wonder why Lotus and the others do not seem as willing to let the marketplace decide which products are the most deserving.

Alexander is a *Computerworld* senior editor, PCs and workstations.

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NEW PRODUCTS

Systems

Hewlett-Packard Co. has expanded its line of Intel Corp. 80386-based personal computers with the addition of a 16-MHz desktop microcomputer.

The HP Vectra QS/16S is based on Intel's 80386SX processor and provides 32-bit internal processing, the company said. The system was reportedly designed for high-performance business applications such as desktop publishing, database management, spreadsheets and entry-level computer-aided design. It can also be used as an entry-level local-area network server or departmental computer serving as many as eight users, the company said.

A base configuration includes 1M byte of random-access memory and is priced at \$3,295.

HP
3000 Hanover St.
Palo Alto, Calif. 94303
800-752-0900

Software applications packages

Manufacturing and Consulting Services, Inc. (MCS) has cut \$500 off the suggested retail price of its Anvil-1000MD computer-aided design and drafting software.

The menu-driven, 2½-dimensional package is now available for \$2,495, the company said. Anvil-1000MD runs on most Intel Corp. 80286- and 80386-based computers and includes construction algorithms, database and drafting features.

MCS
6 Hughes Drive
Irvine, Calif. 92718
714-951-8858

A rotary file and automatic dialer for IBM Personal Computers and compatible systems has been introduced by Vartek, Inc.

Called Influence, the package reportedly can store more than 10,000 names with addresses, telephone numbers and descriptions. The information can be accessed by category, keyword or name, and numbers can be called automatically, the company said. The product is priced at \$98.

Vartek
Suite 304
3 Regent St.
Livingston, N.J. 07039
201-740-1750

A data and text storage and retrieval package for IBM Personal Computers, XT's, AT's and compatibles has been announced by E. Arther Brown Co.

Findex V typically completes a search in about two to six seconds, the vendor said, and users may enter records in several sizes or types. This includes daily

planners, address and phone book files and customer account records.

Report and mail-merge capabilities are also provided. The product is priced at \$49.95.

E. Arther Brown
3404 Pawnee Drive
Alexandria, Minn. 56308
612-762-8847

OS/2 software

MDBS, Inc. has announced that its application development products, Guru and KnowledgeMan/2, are now available under IBM's OS/2 and LAN Manager.

Guru is an expert system shell, and KnowledgeMan/2 is a relational database management system, according to the company. DOS applications written in both products will run under OS/2 without any porting activity, the vendor said, and all multi-tier file- and record-locking techniques between operating system versions are compatible.

Guru is priced at \$6,500, and KnowledgeMan/2 costs \$695.

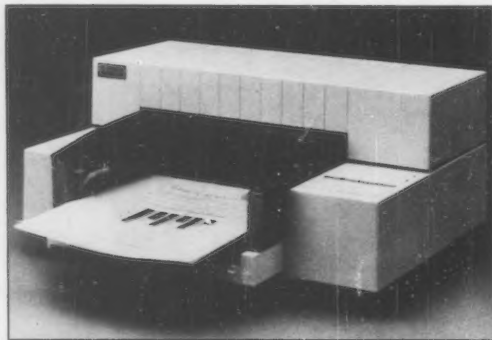
MDBS
P.O. Box 248
Lafayette, Ind. 47902
317-463-2581

Macintosh products

Microtech International, Inc. has announced an unlimited-capacity removable hard disk designed for Apple Computer, Inc.'s Macintosh Plus, SE and II computers.

The R45 can be used for either primary or backup storage and offers an average 25-msec access time, the vendor said. The user can reportedly store as much as 42.7M bytes of formatted capacity data on one removable cartridge. The subsystem costs \$1,099, and each unit is shipped with a 25/50-pin small computer systems interface (SCSI) cable, a 50/50-pin SCSI cable and an external terminator.

Microtech International
29 Business Park Drive
Branford, Conn. 06405
800-325-1895



Microtech International R45 removable hard disk offers unlimited capacity and SCSI links

Second Wave, Inc. has announced a compact four-slot Nubus expansion chassis for the Apple Computer, Inc. Macintosh SE/30 computer.

The Expanse/30 external chassis fits underneath the computer and attaches to the machine through an interface card and cable assemblies, according to the vendor. It reportedly allows the user to operate four Macintosh II Nubus cards.

The company said that it also introduced two Nubus expansion chassis for Apple's Macintosh IIX. The Expanse NB4 and the Expanse II also attach via interface cards and cable assemblies and reportedly increase slot capacity from three to seven slots and three to 11 slots, respectively.

The products are priced from \$1,295 to \$2,295.

Second Wave
Suite 260
9430 Research Blvd.
Austin, Texas 78759
512-343-9661

Development tools

An educational computer-aided software engineering (CASE) workbench product has been released by Visible Systems Corp.

The Visible Analyst Workbench Educational Version software package runs on a variety of personal computer platforms and was designed to help organizations make a smooth transition to CASE technology, the vendor said. The product reportedly employs easy-to-use graphics with common methodology interpretations and is priced at \$295.

Visible Systems
The Bay Colony Corp.
Center
950 Winter St.
Waltham, Mass. 02154
617-890-2273

Cullinet Software, Inc. has announced that Cullinet Enterprise Computing technology has been extended to the IBM PC-DOS environment.

With the introduction of Enterprise:Builder and Enterprise:Generator, the company is targeting professional developers to provide them with a means for

building both stand-alone and cooperative processing personal computer applications. Features reportedly include data definition tools, form painting, reporting and code generation capabilities as well as debugging and communications functions.

Pricing for both products is \$4,000 per unit, and runtime versions for execution of applications and end-user reporting are available for \$250.

Cullinet Software
400 Blue Hill Drive
Westwood, Mass. 02090
617-329-7700



Hewlett-Packard's HP Deskjet Plus printer boasts speeds as high as five times faster than its parent model

Training

A videotape training course for users of Lotus Development Corp.'s 1-2-3 spreadsheet software is now available from Learn PC-Video Systems.

Called Lotus 1-2-3: Beginning Through Advanced Skills, the course reportedly consists of five videotapes, five guide books and five practice disks. According to the vendor, the product is offered in all video formats and is priced from \$995 to \$1,145. Multiple purchase discounts are available.

Learn PC-Video Systems
5101 Highway 55
Minneapolis, Minn. 55422
800-532-7672

Peripherals

A personal computer-based data processing software and hardware system designed for printing checks and business forms internally has been introduced by Westcorp Software Systems, Inc.

According to the vendor, the Softforms Laser Printing System is a laser document and encoding package that can be adapted for use in the banking, payroll systems, property management, insurance and printing industries. A Hewlett-Packard Co. Laserjet Series II printer is also included.

The Softforms Laser Printing System is priced at \$6,995, the company said.
Westcorp Software Systems
Suite 100
2865 Amwiler Road
Atlanta, Ga. 30360
404-448-9709

Hewlett-Packard Co. has introduced another version of its HP Deskjet Plus printer designed to print at speeds two to five times faster than the previous model, the company said.

The non-impact device offers laser-quality output at 120 char./sec. and has six portrait fonts and four landscape fonts.

The printer comes with a standard one-year warranty and is priced at \$995.

HP
3000 Hanover St.
Palo Alto, Calif. 94304
800-752-0900

Board-level devices

Cavu Corp. has introduced the PC Board Tester, designed to reduce product development cycles for add-on boards in IBM Personal Computers and compatibles.

The board comes with a menu-driven software package and lets quality-assurance personnel and technicians select the address or address range for I/O and memory reads, individually disable the I/O and memory reads and run quality-assurance tests without restarting test programs. The product can be customized for special test software applications and is priced at \$995, the company said.

Cavu
Suite 302
5711 Six Forks Road
Raleigh, N.C. 27609
919-846-9275

A graphics adapter designed for users of IBM Personal Computers, PC XT's and AT's has been announced by Boca Research, Inc.

According to the company, the Dual Graphics Adapter enables PC users to enhance monochrome monitor resolution and upgrade to an IBM Color Graphics Adapter monitor using only one adapter. Additional features reportedly include automatic mode switching and a 25-pin parallel port. The board is priced at \$99 and includes a two-year warranty and free technical support.

Boca Research
6401 Congress Ave.
Boca Raton, Fla. 33487
407-997-6227



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 31. Dir. Mgr. Suprv. of Programming
 32. Programmer/Methods Analyst
 35. Dir. Mgr. Suprv. QA/WP
 38. Data Comm. Network/Systems Mgt.
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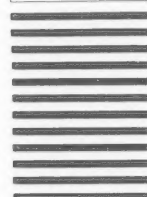
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 50. Business Service (except DP)
 60. Government — State/Federal/Local
 65. Communications Systems/Public Utilities/Transportation
 70. Mining/Construction/Petroleum/Retailing/Agriculture
 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
 85. Computer & DP Services, including Software/Service/Bureau/Time Sharing/Consulting
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 11. President/Owner/Partner/General Mgr.
 12. Vice President/Asst. VP
 13. Treasurer/Controller/Financial Officer
 41. Engineering/Scientific/R&D Tech. Mgt.
 51. Sales/Mktg. Mgt.
OTHER PROFESSIONALS
 60. Consulting Mgt.
 70. Medical/Legal/Accounting Mgt.
 80. Educators/Journalists/Librarians/Students
 90. Others _____
 (Please specify)

- 3. COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor or consultant:
 A. Mainframes/Supermains
 B. Minicomputers/Small Business Computers
 C. Microcomputers/Desktops
 D. Communications Systems
 E. Office Automation Systems
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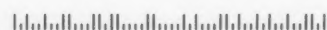
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NETWORKING

DATA STREAM

Ellis Booker

Call 'em as you see 'em



At the time of the breakup of the Bell System in 1984, the smart money was on the long-distance market. With the end of AT&T's monopoly, most observers expected to see an influx of new players and innovative services. By comparison, the life of the local-exchange carrier, which retained its monopoly franchise after divestiture, would continue as a sleepy, predictable business.

A lot of this, we now see, was a miscalculation, proving that even the best-laid plans of progressive regulators often go awry.

While the local-exchange companies scrambled to enhance their central office-based services — and so stave off the threat of their local networks being bypassed by customers using microwave and other private facilities — the long-distance companies mostly were occupied with punishing price wars and customer campaigns. These campaigns flattened the once-impressive price differentials between, say, MCI and AT&T.

On the technology front, the leading long-distance carriers — AT&T, MCI and U.S. Sprint — have tended to bring out new services almost on top of one another, further obscuring company differences. A good recent example is fractional T1 ser-

Continued on page 43

DG aims wide shot at OSI hoop

BY ELISABETH HORWITT
CW STAFF

WESTBORO, Mass. — Conceding that it cannot compete on equal footing with first-string players such as AT&T and IBM, Data General Corp. hopes to win by playing on everyone's networking team as well as in the standards ballpark, according to DG section manager Kumar Shah.

As part of its campaign to provide the most comprehensive support of the Open Systems Interconnect (OSI) standard, DG last week announced support for the CCITT 802.5 Token-Ring standard, with plans in the works to support IBM's version of the protocol.

Initially, DG will provide 802.5 support for its PCI communications software, allowing DG MV minicomputers to act as servers on a Token-Ring net-

work of IBM Personal Computers and Personal System/2s, as well as DG's own PC compatibles, according to communications product manager Jane Ingalls.

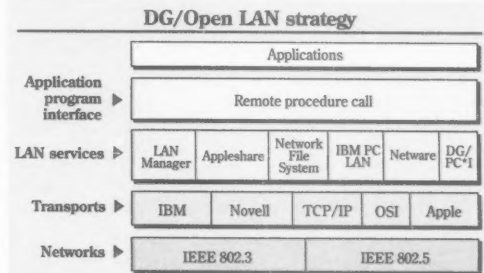
A future DG release will im-

plement IBM's Network Based Expanded User Interface (Netbeui) on MV minicomputers, Ingalls said. This will allow DG hosts to "look like an IBM node on a Token-Ring network" and

Continued on page 44

Mixed bag

DG wants its minicomputers to serve a variety of PC LAN environments



SOURCE: DATA GENERAL CORP.

CW CHART: DOREEN DAHLE

Newbridge follows NET's footsteps

BY ELISABETH HORWITT
CW STAFF

HERNDON, Va. — Following Network Equipment Technologies, Inc.'s (NET) lead, Newbridge Networks, Inc. recently became the second major T1 vendor to enter the LAN-to-WAN interconnectivity arena by way of a joint development agreement with a bridge router company.

NET set the trend earlier this year by allying with Cisco Systems, Inc. and announcing a multiprotocol bridge and router last month that is based on the Menlo Park, Calif., vendor's products. Newbridge has announced an agreement with Wellfleet Communications, Inc. to develop a variety of local-area network

bridging and routing functions for Newbridge's Mainstreet line of T1 multiplexers. The products will include a learning bridge for the 3600 Mainstreet family and an integrated network management workstation. The LAN interconnectivity market has become a competitive focal point for T1 vendors, which hope to fill up wide-area networking bandwidth with LAN-to-LAN transmissions, according to Mary Modahl, an analyst at Forrester Research, Inc.

Firms such as NET and Wellfleet bring bandwidth management to the party, allowing users to reroute voice traffic automatically over the public network when LAN-to-LAN traffic becomes heavy, Modahl said. "This is very attractive because

no one is really sure how much traffic will be traveling over LANs, but it's a safe bet that it will be bursty and heavy when people transfer files," she said.

Out of 50 Fortune 1,000 firms recently surveyed by Forrester, 44 are currently providing remote LAN links for micro-to-mainframe connectivity while 21 are linking multiple LANs across WANs, the Cambridge, Mass., research firm said.

The next couple of months should see one of the two remaining dominant players in the T1 multiplexer field — Timeplex, Inc. and Digital Communications Associates, Inc. — team up with Proteon, Inc., the only leading bridge router vendor without a T1 alliance, Modahl said.

Exploring options for CIM

BY ELLIS BOOKER
CW STAFF

MINNEAPOLIS — Executives from major manufacturers recently related how their companies have tried — and succeeded — to move away from the vaunted ideal of computer-integrated manufacturing (CIM).

Speaking at a briefing sponsored by software vendor Forth Shift, officials at Eastman Kodak Co., Control Data Corp. and Thomas J. Lipton, Inc. related how they tried mainframe-based, centralized CIM but have since opted for Forth Shift's PC software running on a local-area network.

After spending 10 years and \$66 million on a centralized CIM system, Kodak is now heading in the opposite direction. Since 1986, it has installed about 50 personal computer-based control systems at manufacturing sites.

"Decentralization is not easy. You have to rethink how to run the business," said Jack Philbin, manager of Kodak's decentralized manufacturing support systems. Philbin has become an ardent advocate of this "small is beautiful" concept. "Costly impractical madness" is how he de-

Continued on page 42

Inside

- Micro-to-mainframe players jump to hot areas of market. Page 42.
- Open Token Foundation gathering steam. Page 44.
- OSI slowly catching on. Page 44.

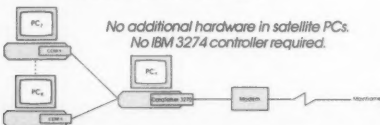
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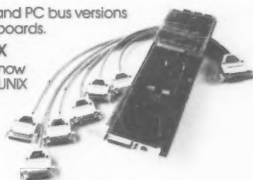
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OS/2, Macs targeted for links

BY ELISABETH HORWITT
CW STAFF

Two leading micro-to-mainframe players have migrated their products to potentially hot areas of the market: Mac-to-VAX connectivity and OS/2 Extended Edition.

Sterling Software, Inc. has announced its Presentation/Answer, which is said to allow users to extract and download data from a variety of IBM mainframe database environments and load it automatically into the files of popular software packages that support OS/2 Extended.

Answer/DB may be the first micro-to-mainframe product that is based on OS/2 Extended, as well as IBM's peer-to-peer protocol LU6.2, according to Fred Barrett, president of F.J. Barrett and Associates, an Irvine, Calif., consulting company. Major vendors such as Digital Communications Associates, Inc. and Attachmate Corp. will likely move slowly toward LU6.2 support because of their heavy investment in 3270 emulation products, according to Barrett.

However, there have been

rumors of similar announcements from software vendors who, like Sterling, support microcomputers as intelligent front ends. Spectrum Concepts, Inc., for example, should shortly announce an OS/2 Extended version of its LU6.2 communications software, XCom6.2.

ASCII and ye shall receive
Microcomputer file formats supported by Presentation/Answer will include ASCII text, Lotus Development Corp.'s 1-2-3 and Dbase IV, whenever Ashton-Tate Corp. announces OS/2 Extended support for the product, according to Sterling director of marketing Edward Lopez.

Mainframe database environments supported include IMS/DB, DL/1, DB2, SQL/DS and VSAM, as well as third-party products, Sterling said. Database administrators determine what data is accessible to a given user down to the field level, according to the vendor. A joining feature allows the user's view to encompass multiple relational and nonrelational databases.

The product's user interface is said to be based on IBM's Presentation Manager and to con-

form to IBM's Systems Application Architecture guidelines, including Common User Access specifications.

Scheduled for mid-1990 availability, Presentation/Answer is priced between \$18,000 and \$56,000 for a package that supports 10 concurrent Personal System/2 users.

Datability Software Systems, Inc. in New York announced an Apple Computer, Inc. Macintosh version of Remote Access Facility software that connects IBM Personal Computers to Digital Equipment Corp. VAXs. Macraf is said to enable Macintosh users to access files, applications and peripherals on remote VAXs without needing to know remote computer commands.

The software is said to support DEC's Local-Area Transport protocol and to handle multiple VT100 or VT200 VAX sessions on one screen as well as file transfer speeds of up to 120K byte/sec.

The initial release is scheduled for availability by the end of June. Pricing for the Macintosh software is \$295 per microcomputer; VAX software is priced at \$395 per Mac user.

CIM options

FROM PAGE 41

finer traditional, mainframe-based approaches to CIM.

Asked about the need for interfaces between manufacturing cells and other corporate systems, Philbin said, "I hate interfaces; interfaces are evil." He said they take time and money to install and usually have no role in day-to-day manufacturing operations. "We have gotten too clever with systems," he continued. "We have to get back to basics." A more sensible approach, he said, is to send "financial data upstream" on a monthly basis once a month in summary form. Philbin was equally hard on centralized electronic messaging systems such as electronic and voice mail, which he said will hurt, not help, competition.

Philbin roundly criticized the old, centralized manufacturing resource planning (MRP) package developed by Kodak, which he said slavishly automated existing manual procedures instead of rethinking them and their impact on the bottom line of the business. "Every single bad thing in the old [manual] system was transferred to the new," Philbin said.

Kodak first tested a PC-based

approach to MRP in 1986 at its plastic molding plant in Rochester, N.Y. The idea, Philbin said, was to turn the 4 million square foot plant, which houses 16,000 workers, into a "street of shops," interacting with one another and the corporation much the way outside suppliers would.

A buzzword in the industry for a decade, CIM has stirred widespread interest and academic analysis but few examples of working installations at U.S. companies. Meanwhile, nations with leaner industrial muscle — notably Japan — are giving U.S. firms incentive to shift gears.

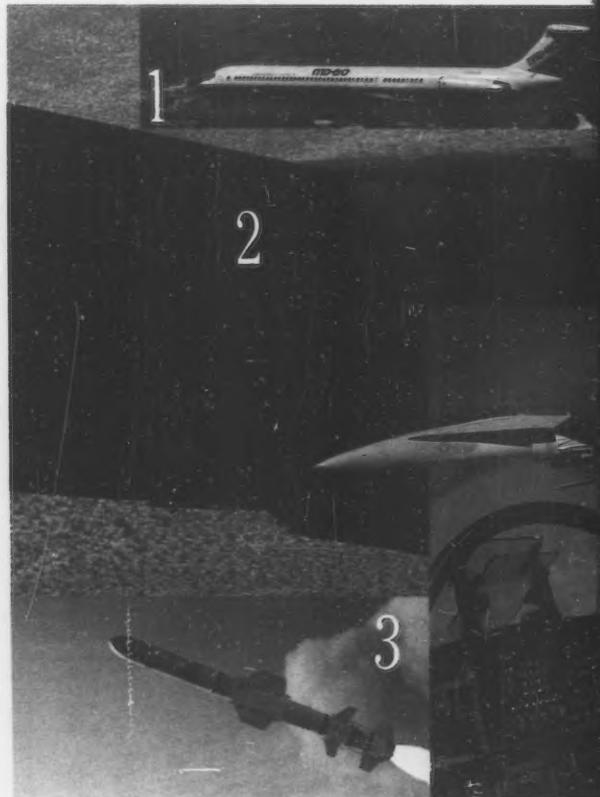
A slow CIMmer

"Only 10% of the nation's 500,000 manufacturing sites have any kind of manufacturing control system, but the majority said they plan to have CIM by the 1990s," said Jerry Bowman, vice-chairman of Forth Shift.

Forth Shift sells an MRP system that coordinates production schedules with customer orders and inventory controls.

Forth Shift's figures indicate the majority — or 70% — of MRP systems today are implemented on minis, with 10% on mainframes and 20% on micros. Bowman nevertheless predicts the micro MRP market will outpace that of minis, thanks largely

Look where our information systems are today.



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to the climbing power curve of networked PCs and their ease of installation.

That was the experience at Kodak, where the first Forth Shift system took just 12 weeks to deploy. Philbin's staff of 10 is currently handling installations at two to three sites per week.

At Lipton's Canadian division, a decade-old homegrown CIM system was quietly undermined in 1986 when Martin S. Visagie, manager of export and logistics development, began testing PC-based manufacturing control systems.

"Nobody really took us seriously," Visagie said.

It's in the sauce

After evaluating more than 200 packages for 18 months, Lipton's initial system — put into its Ragu spaghetti sauce plant in Peterboro, Ont. — is now in four plants and will be in a fifth by August.

Visagie said he will achieve CIM-like integration using interfaces between the plant system and existing mainframe financial and marketing applications.

"You have to be careful not to mistake MRP for CIM," said analyst Paul A. Schneider, founder of Cimplicity Ltd., a manufacturing consulting firm in Barrington, Ill. "CIM is an overall um-

WE HAVE gotten too clever with systems. We have to get back to basics."

JACK PHILBIN
KODAK

brella issue." MRP is the "solution" to CIM, he said, in much the same way as a hammer is the "solution" to building a house.

Still, Schneider sympathizes with the frustration that companies such as Kodak and Lipton express: "In boardrooms, you have CEOs under pressure to do something, and they decide to do CIM. The problem is, they don't know what technologies to choose, so the tendency is to take on everything."

Echoing a point made by Kodak's Philbin and Lipton's Visagie, Schneider said companies throw money at CIM technologies without first appreciating the strategic nature of the concept. "It's hard to define CIM in terms of a box," he said. "Instead, you need to figure out how it can fulfill a strategic objective."

Booker

CONTINUED FROM PAGE 41

vices. In late April, AT&T said it was adding fractional T1 support; in May, both MCI and U.S. Sprint dutifully announced their own fractional T1 plans.

Or take products based on integrated services digital network (ISDN) technology.

AT&T was there first with its Primary Rate Interface service. But MCI has said it would have true ISDN by the first quarter of next year and offer "ISDN-equivalent" services by this fall. This leaves U.S. Sprint as the odd man out. But a U.S. Sprint ISDN product is, like a summer promotional blitz by McDonald's, Wendy's and Burger King, practically assured.

Have today's long-distance companies, once regarded as the flagships of divestiture, been relegated to a commodity business? Are customers differentiating among them on nontechnology, non-price-related items like corporate image — U.S. Sprint's slick "pin drop" television commercials vs. AT&T's unblinking "slice of life" ads?

To some extent, this is true. All three are emphasizing service — read customer service — in their current campaigns,

although U.S. Sprint, the only carrier with a fully fiber-optic-based network, continues to push what it claims is the superior quality of its facilities. And all three are working closely with their major accounts and beginning to target the special service needs of vertical markets like banking and health care.

But there is one technology, increasingly important to large corporate users, that could radically distinguish one long-distance carrier from another. Network management is the watchword for the '90s.

Control is the key

Increasingly, customers want flexible network management tools for public facilities. Savvy and experienced about telecommunications in the wake of divestiture, they want to have the same level of control they enjoy on private networks when their data and voice traffic happens to be conveyed over "public" lines.

Some tools for this are already in place. The out-of-band signaling control of ISDN promises a standardized way of routing and monitoring traffic across networks. Many users are anticipating ISDN's promised dynamic rerouting of calls in response to changing traffic

loads or emergencies such as a network outage.

However, robust network management is tricky enough to accomplish on private networks. The ideal of controlling "virtual" private networks on public facilities that cross between different carriers and over equipment from different vendors is still being hammered out in the standards bodies and in the marketplace. All three major long-haul carriers have names for their offerings: AT&T's Unified Network Management Architecture; MCI's Integrated Network Management System and U.S. Sprint's Integrated Network System Interface and Terminal Equipment.

During the interim period before ISDN's ubiquitous solution, expect AT&T, MCI and U.S. Sprint to jockey for position with these network management services and attempt to woo large users from their private networks. To be sure, the carriers will continue their hamburger-outlet price fights, but watch for developments with these offerings to see the real direction of the marketplace.

Booker is *Computerworld's* Chicago correspondent.



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OSI forum carves out its niche

BY ELISABETH HORWITT
CW STAFF

BERNARDSVILLE, N.J. — Approximately a year after the Open Systems Interconnect/Network Management Forum (OSI/NMF) was founded, several events are proving its viability as a standards body. These include ballooning membership [CW, May 15], a recent alliance with two other key standards organizations and a revamped schedule for finalizing the specifications that will allow its member vendors to achieve OSI-based interoperability for their network management systems.

The OSI/NMF, whose membership currently numbers more than 60 network and computer vendors, was formed last July to select and recommend certain subsets of OSI protocols to ensure consistent implementations of the standard among its members' products.

"We have defined a narrow area of cooperation in order to expand the area of competition," said John Miller, OSI/NMF's president and a director of new services development and network management at AT&T. Drawing an analogy from the home video industry, he added: "Let's not waste time arguing about the size of cassettes but just make good movies."

Last January, the OSI/NMF released specifications for the

Common Management Information Protocol, which defines how different network management systems exchange information. It hopes by this summer to complete message sets — the protocols that define the type of information sent — for fault and configuration management, Miller said.

This will allow vendors to "build applications at either end to interpret and display the information," he added.

Objects coming

Also, the OSI/NMF intends by summer's end to define a number of "objects" — the actual networking devices that will be managed, Miller said. The OSI/NMF plans to leave a lot of leeway in its definitions, however, for variations among different vendors' products, he added.

When all of the above pieces are defined, vendors can start building applications to provide integration with other companies' network management systems, Miller said. Several such products should take shape next year, he added.

Concurrent with this work, the Forum hopes to work with the Corporation for Open Systems (COS), a U.S. standards body, and its European counterpart, Standards Promotion and Application Group (SPAG), to develop product testing for conformance to its specifications.

The work will be conducted under the terms of an agreement finalized two weeks ago [CW, May 22].

"SPAG and COS are the two most influential bodies on OSI usage in general" as well as in the development of OSI conformance testing, Miller said.

The agreement may also result in IBM finally joining the Forum, according to Michael Gering, a development programmer

at IBM's Communication Products Division in Raleigh, N.C. IBM made a public statement several months ago that a formal agreement with COS and SPAG was a prerequisite for the vendor's becoming a Forum member. Digital Equipment Corp. is another fence-sitter that may be pushed into committing to the Forum by the agreement.

IBM spokesmen have suggested that there are too many standards bodies already and expressed concern that each organization would come up with its own OSI subset, forcing vendors

to develop three versions of the standard. There already have been inconsistencies in overlapping OSI specifications in the transport area, Gering said.

Regular interaction between the three standards bodies should ensure consistency of protocol definitions as well as better coordination of standards efforts, a Forum spokeswoman said. However, Miller expressed surprise at Gering's allegation: "If there are any inconsistencies [between the different bodies' implementations], they are small in nature."

Open Token group flips its hat into the ring

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — It has yet to take off, but the Open Token Foundation (OTF) is picking up some steam. OTF will stage its first forum in Dallas next month to highlight experiences of Token-Ring users.

Among other issues on the forum agenda are software and protocol interfaces, as well as future Token-Ring technology, including 100M-hit Fiber Distributed Data Interface (FDDI).

An inaugural newsletter is supposed to kick off soon, and a vendor/product directory is due out in late summer.

OTF was formed last year to promote interoperability between different Token-Ring implementations, mostly in response to proprietary changes made by IBM to its IEEE 802.5-based products.

It is estimated that IBM controls at least 90% of the Token-Ring market. Vendors are concerned that an inability to provide compatibility with IBM's Token-Ring will cost them sales. The group may also challenge the validity of Token-Ring patent claims by Olof Soderblom and his Netherlands-based company.

Formed in December, the group recently added 15 mem-

bers, bringing the total number of participants to 23. Among the new member companies are NCR Corp., Network General, Inc., Microcom, Inc., Gateway Communications, Inc., Synoptics Communications, Inc., Interlan, Inc. and Vitalink Corp.

"We are actively seeking additional members from the user community to develop a vendor-user dialogue that will help produce needed and innovative Token-Ring products," said Robert Madge, president of Madge Networks Ltd. and a co-founder and president of OTF.

The organization recently appointed its first executive director, Colin Mick, a vice-president and general manager of the services division of Lanquest Group, Inc. Lanquest was retained separately to provide OTF with ongoing administrative assistance and consultative services.

Data General

FROM PAGE 41

run applications in Netbeui-compliant networking environments such as IBM's LAN Server program and 3Com Corp. and Microsoft Corp.'s LAN Manager, she added.

However, DG has yet to support IBM's Advanced Program-to-Program Communications (APPC) protocol for the PC LAN environment, Ingalls said: "APPC is what IBM is pushing, but right now Netbeui is most predominant on PC LANs."

Another future DG release will provide support for IBM's bridging protocols for Token-Ring networks, which differ significantly from the CCITT version, Ingalls said.

DG intends to "broaden the scope of our PC integration to go beyond OSI" to proprietary networking protocols, Ingalls said. Earlier this year the vendor announced support for Novell, Inc.'s Netware. DG intends in the near future to announce support for Apple Computer, Inc.'s Appletalk as well as 3Com Corp. and Microsoft Corp.'s OS/2 LAN Manager, Ingalls said (see chart).

On the network management

front, DG intends to support "first-tier" network management systems such as IBM's Netview and AT&T's Unified Network Management Architecture (UNMA), Shah said. A DG host may eventually be able to act as a limited Netview focal point, just as IBM intends its AS/400s to perform in the future, Shah said. DG will not necessarily use Netview/PC to link its systems to Netview, however, he added.

In addition . . .

The company also intends to support Common Management Over TCP/IP, a protocol designed to allow migration from TCP/IP to OSI network management standards.

Also, DG has announced support of the OSI Common Management Information Protocol (CMIP) as a way for its network management system to interoperate with other OSI-compliant systems. DG intends to demonstrate at the Showcase '90 interoperability demonstration late next year a bridge that "goes beyond CMIP" in its ability to communicate with UNMA, Shah said.

DG hopes to differentiate its DG/Open Network Management System from the rest of the

pack — and particularly IBM — by providing peer-to-peer connections among different network management nodes. Most network management systems, such as Netview and UNMA, define a node either as a manager (in IBM-ese, "focal point") that controls and collects information from other systems, or as an agent that sends data to a manager.

While IBM allows one Netview focal point to send information to another, Netview does not support IBM's PU2.1 peer-to-peer networking protocol, so the system is still "basically hierarchical, with no reports distributed among multiple nodes," Shah said.

In contrast, DG's network management system allows "an agent to be a manager in its own right," collecting data from a network subsystem, filtering out extraneous data and sending on to another manager only that information that is relevant to a particular management level, Shah said.

DG/Open Network Management System currently runs on MV hosts but will be ported to DG's reduced instruction set computing- and Unix-based Avion product line next year, Shah said.

NEW DEALS

DEC net links hospitals

The Specialty Hospital Group of National Medical Enterprises has tapped Digital Equipment Corp. to tie 74 U.S. psychiatric hospitals into its Washington, D.C. headquarters. The multiyear, multisite contract calls for the appropriate DEC VAX system and supporting peripherals to be installed at each site. Accompanying software will support integrated operations and enable SHG to consolidate financial information from all the hospitals. Ten sites already have VAX systems, with seven more to be done by June.

U.S. Sprint Communications Co. has won a multiyear contract to design and build a corporate backbone network for Apple Computer, Inc. The T1 network will link about 60 Apple locations throughout the U.S. and tie into both the public data network operated by U.S. Sprint packet network subsidiary Telenet Communications Corp. and Sprint's Meeting Channel, a worldwide videoconferencing network. According to U.S. Sprint, which did not provide financial details of the contract,

the network will account for 85%, or \$3.5 million, of Apple's telecommunications traffic.

The Britannia, a UK building society, has chosen Timeplex, Inc. to install a packet-switched data network valued at \$1.5 million. Timeplex will supply 45 Timeplex nodal processors to connect the society's 251 branches nationwide to its head office in Leek, Staffordshire. The society chose to replace a modem network with the Unisys Corp. subsidiary's packet-switching equipment to handle increasing data traffic volume and add reliability, Timeplex said.

Child World, an Avon, Mass.-based toy retailer, has selected AT&T subsidiary Tridom to install a very small-aperture terminal satellite communications network valued at \$2.1 million. Child World, a subsidiary of Cole National Co. in Cleveland, will install the network to handle electronic mail, credit authorization, price lookup and point-of-sale updates traveling between headquarters and 175 stores in the Midwest and Northeast.

MANAGER'S JOURNAL

EXECUTIVE TRACK



Pat J. Meneely was promoted to vice-president of corporate information services at **Wheeling-Pittsburgh Steel Corp.** in Wheeling, W. Va.

Meneely joined Wheeling-Pittsburgh in June 1988 as information services officer. He had 14 years of experience in IS management at major corporations, most recently at Kimberly-Clark Corp. in Dallas.

Meneely holds a master's degree in human resource management from Houston Baptist University, a master's in business administration from the University of Pittsburgh and a bachelor's degree in business systems analysis from the Indiana University of Pennsylvania School of Business. He lives in Bridgeville, Pa.



Barbara Hales was promoted to vice-president of information systems and distribution at **Howard W. Sams & Co.** in Indianapolis, a technical publishing division of Macmillan, Inc.

Hales is responsible for IS, shipping, customer service, order entry and electronic publishing at the company's several publishing divisions.

Hales has been the company's director of IS for the past seven years.

Previously, she was manager of program development at Anacom, Inc. She holds a bachelor's degree in mathematics from the University of Detroit.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor-Management, *Computerworld*, Box 9171, 375 Conituate Road, Framingham, Mass. 01701-9171.

IS bridge over oily waters

Kendziorek's hodgepodge of computers works to calm Valdez spill from field outpost

BY J. A. SAVAGE
CW STAFF

Every information systems department has days that seem like a nightmare. But that's the daily routine for Marshal Kendziorek, data coordinator at the Alaska Department of Environmental Conservation.

On the day after the *Exxon Valdez* oil spill disaster in late March, Kendziorek was pulled from his office in Juneau and sent to the scene to create a remote office with whatever computers and peripherals were available.

Now inhabiting a temporary office site in a corner of Valdez's American Legion Hall, Kendziorek is still there, mapping the leading edge of the oil 500 miles away and keeping the department's ad hoc jumble of computers and peripherals running.

Reign squall

As in the field office of a large battleground, confusion reigns in the temporary office. Researchers, recently disgorged from helicopter and small plane overflights of the spill, rush in and out, dispatching the latest maps to be entered into the department's database. Orders are shouted over walkie-talkies, and secretaries desperately try to keep track of who is where at any given moment.

Amid this seeming chaos, Kendziorek stays calm, helping the support staff manage balky printers and tending to the myriad requests for information from environmentalists, Native American organizations and state and federal agencies.

He points to a time card that shows he worked a 23-hour day on April 1 and says this is typical of his recent schedule. Despite long hours, he takes satisfaction in the fact that Exxon Corp. has given him a blank check to buy whatever

equipment is needed for the temporary office and is covering the overtime hours of the 25 staff members.

No amount of money, however, can move equipment easily in the still-frozen north. Weather often closes the tiny airport in Valdez, and ground transportation to Anchorage is a six-hour trek at best. Kendziorek urges staffers coming in from larger cities to bring supplies with them. "I had to make a trip to Anchorage just to get

stocked makeshift kitchen.

Observers say that the self-effacing Kendziorek is automating operations far more than any other effort surrounding the spill.

"Other agencies collected data and would enter it in [to the minicomputers] when they got a chance. The thing Kendziorek did was to get the information almost in real time," says Fritz Funk, statewide herring biometrician at the Alaska Department of Fish and



MOULDER ARCH

diskettes and plotter supplies," he says.

Kendziorek overcame some early difficulties, such as having to sleep on the office floor for a couple of weeks. He now has gracious quarters by Valdez standards, with a room in an extra-wide trailer. Many cleanup workers have nothing more than pup tents to shelter them from the harsh Alaskan spring. The IS department tries to avoid interminable lines for food at the few restaurants in town by providing a

Game. Funk used maps generated by Kendziorek to plan where to carry out herring spawning studies, because herring mating season began shortly after the spill.

Gathering clues

In addition to mapping and office functions, Kendziorek's department has a database of "evidence" from the spill.

"It existed from the second day on," says Doug Martinson, an analyst

Continued on page 47

Treating the problem, not the symptoms

BY ALAN J. RYAN
CW STAFF

When the going gets tough, the tough get going. But sometimes it may be too late.

Compelling events such as increased foreign competition and deregulation are too often the impetus for companies to invest in information systems.

"By reacting to difficult circumstances," said Pat Mullen, director of information systems marketing at Digital Equipment Corp., "companies do not have the opportunity to follow the kind of rational business decision process they would normally use for a major investment decision." He was

speaking at a recent Profit-Oriented Systems conference in Cambridge, Mass.

Fighting fire with fire

The challenge is to improve the effectiveness of an organization through investment in technology. But too often, he said, companies use technology to solve technological problems.

Mullen said that studies commissioned by DEC have shown that IS spending per employee has grown by as much as 7% during the last 10 years but that productivity gains have not increased incrementally.

Why? Because the spending has not been careful spending, he said.

Another study showed that for more chief executives, human re-

source concerns are the top priority. Thus, Mullen said, "Technology that is not applied to solving the problems of people in business is misapplied." By bringing the technology to the areas of concern, productivity gains will be obvious.

It can be done. For example, Mullen said, if finding and training customer support people is an ongoing challenge at a company, then the information systems group could design and implement an expert system for customer support.

The expert system could "take up the slack" in the organization by providing on-line product and support information to customer support representatives or, possibly, directly to customers.

TAKING
CHARGE

Les Gilliam

CASE not for
everyone

For many years, the principal problem in the information systems world has been the lack of a standard, disciplined and organized approach to the development of application systems that would yield predictable, quality products.

The emergence of an "engineering" approach to the problem is now becoming a reality in the form of computer-aided software engineering (CASE) tools.

But CASE is not magic and is not a panacea. It will not solve the problems of weak management, inadequate staff skills, uncooperative attitudes or a lack of credibility with clients. It will only exacerbate such problems.

The companies that have achieved success with current development tools are the ones with a high probability of success with CASE. The others are likely to fail — and spend a lot of money in the process.

The initial CASE effort should be considered research and should be executed carefully. One major company interviewed more than 50 other companies regarding the use of CASE before finalizing its plans. Its pilot project was quite revealing.

It should be no surprise that CASE products and staff training can be quite expensive. But many are surprised by the significant outlay required for increased mainframe power and desktop workstations.

CASE products require an extensive learning effort. There are so many new terminologies and new concepts that analysts have to go through an "un-learning" phase. Management should not expect too much too soon.

Comments to users should surely be tempered. IS representatives should not state or imply that these tools will solve all the problems between users and IS.

CASE must be introduced and implemented in an orderly manner to gain the support and cooperation of all concerned. To try to force a drastic change will lead to failure. Experienced users have reported that their companies suffered a serious "culture shock" when CASE was implemented.

CASE users have also stated

that a firm methodology should be in place before the technology is brought in. A good methodology should prove useful in either the CASE or non-CASE environment.

It should also be adaptable to applications on the mainframe, departmental or personal computers. The methodology should be useful to both the IS development staff and developers in

the user community.

There has been much discussion recently about large IS shops moving toward a distributed environment in terms of computing resources, application development and processing control. To do this, IS management endeavor to determine how or if CASE can be successfully utilized in both the centralized and distributed develop-

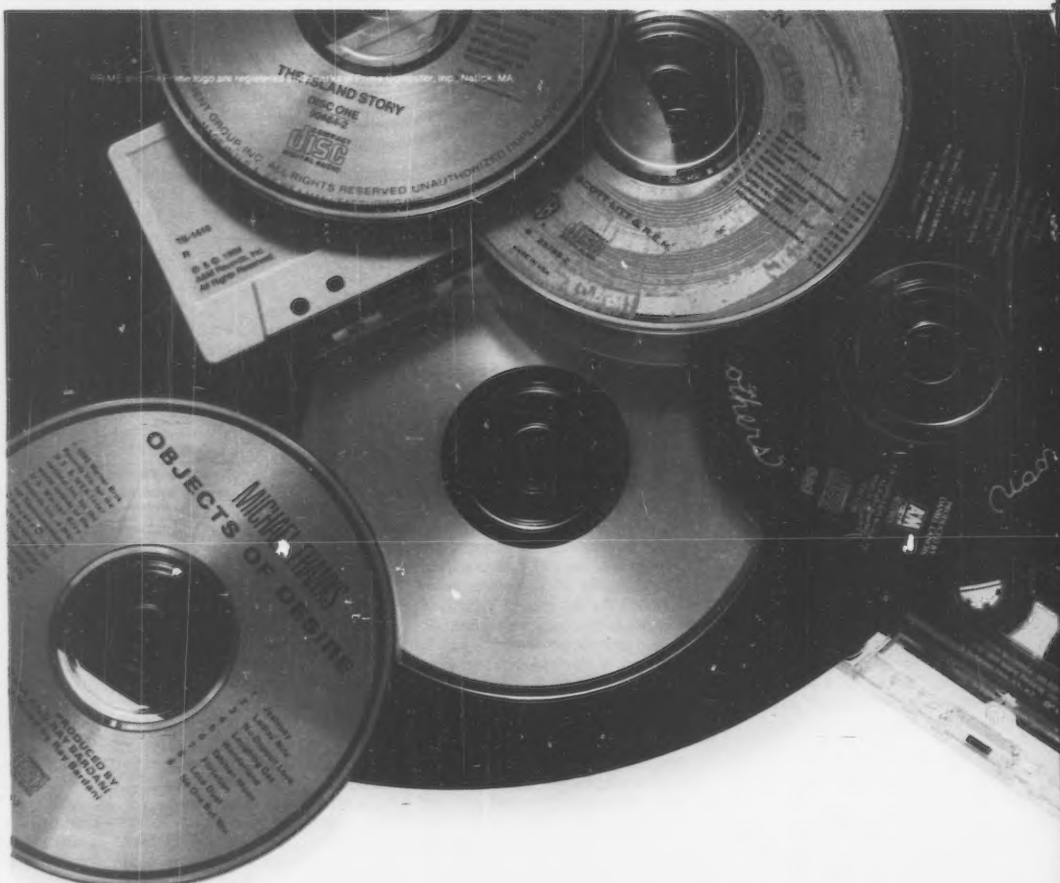
ment environments.

CASE technology is new and developing. Many products are on the market now, and more are sure to come. Other vendors are likely to enter the field.

New CASE users should be very careful in selecting a vendor and in choosing the CASE products because of the required long-term commitment. Since they will be making a large in-

vestment in software, hardware, training and analyst time, they cannot change products or vendors whenever a new or better product is announced. So it will pay to deal with a vendor that will continually improve its products.

Gilliam is president of Gilliam Associates, a computer management consulting firm based in Ponca City, Okla.

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Oil

FROM PAGE 45

and programmer. "It has information such as where a particular roll of film or videotape may be and what is on it. It has field notes, 70,000 water samples and daily staffing rosters."

Kendziorek, who has a background in biology, was always at-

tracted to computers. "My forte was mathematical modeling of ecological systems," he says. He proudly announces that he still has one of IBM's first personal computers — "serial No. 245."

He began his IS career with the state of Alaska five years ago. "It was either that or wait for jobs with all the other biologists," Kendziorek says. He set up local-area networks for two

offices in Anchorage and Juneau using NCR Corp. 3390s. He was working on a third regional office when the Valdez oil spill occurred.

PC spree

Kendziorek bought two personal computers in town, brought one more from home and boarded a plane bound for Valdez in the span of two hours.

The IS operation that Kendziorek has established since then is nothing fancy, but it is at the spill site, and it is working. Exxon did not have mapping systems up and running until April 15, according to Ron Goodman, Exxon's manager of surveillance at the spill. Currently, Exxon has two PCs to generate customized maps.

Kendziorek's secret was to

keep the systems small. Until mid-May, he had seven Compaq Computer Corp. machines based on Intel Corp.'s 80386 processor and about seven more laptop computers of varied origin. Then, he installed nine NCR 3390 networking workstations running Novell, Inc.'s Netware 2.15.

When he arrived March 25, Kendziorek took his three com-

"FOR THE first few days, we had all 11 million gallons right here in only 40 square miles. Then, there was a storm. It took off and just flew."

**MARSHAL KENDZIOREK
ALASKA DEPARTMENT
OF ENVIRONMENTAL
CONSERVATION**

puters and began work immediately, with some well-timed help from oil spill expert Erich Gundlach, president of Narragansett, R.I.-based E-Tech, Inc. Gundlach arrived the next day with mapping software from Generation 5 Technology, Inc. in Denver. He did not have the expertise to use the software, which he had obtained only two weeks before the spill, so he and Kendziorek developed command skills through trial and error.

Kendziorek's first duty was to map the spill. "For the first few days, we had all 11 million gallons right here in only 40 square miles," he says. "Then, there was a storm. It took off and just flew."

"There was a lot of different data taken about what was actually being hit. To make it worse, we were just starting to learn Autocad," Kendziorek says. Kendziorek and Gundlach's maps grew more detailed as they adapted to the mapping software packages.

Mapping the course

Kendziorek, meanwhile, had to get plotters to draw the maps and more PCs and peripherals to handle the information demands on the department. In the early days of the spill, he also did his own flyovers to determine where the spill was heading. "From 500 feet up, you could smell it," he says.

Kendziorek would like to return home to Juneau and finish the networking project he was working on when the spill occurred.

The oil, however, is not cooperating. It continues its 500-mile path southwest, and the cleanup has hardly begun.

"When will we be able to close?" Kendziorek says. "That's the great unknown."

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Fig. 4

Fig. 2

Fig. 1

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CALENDAR

The imminent collisions between powerful workstations and lower cost personal computers will be the theme of a conference by The Yankee Group called Sparcintosh.

The two-day program, to be held July 25-26 in San Francisco, will focus on the purchasing trends of large users. The program will cover such issues as channel conflict, customer direction, software direction, technology direction and market definition. For more information, contact Corey Green at The Yankee Group, 200 Portland St., Boston, Mass. 02114.

JUNE 4-10

CEPA-FACE Joint Conference. Anaheim, Calif., June 4-5 — Contact: Pat Johnson, The National Society for Computer Applications in Engineering, Planning and Architecture, 5 Park Ave., Gaithersburg, Md. 20877.

EDI: Information Partnerships and Competitive Advantage III. Arlington, Va., June 4-6 — Contact: Phil

lips Publishing, 7811 Montrose Road, Potomac, Md. 20854.

Automated Government Benefit Symposium. Washington, D.C., June 5 — Contact: Ann Janson, American Bankers Association, 120 Connecticut Ave., N.W., Washington, D.C. 20036.

Northeast Profs Users Group (NEPUG) Spring

Meeting. Boston, June 5 — Contact: Hal Bersani, John Hancock Financial Services, T-16 Info Center, P.O. Box 111, Boston, Mass. 02117.

The Intelligent Corporation Conference. New York, June 5-6 — Contact: The Ruth Stanat Forum, Suite 1301, 404 Park Ave. S., New York, N.Y. 10016.

Data and Process Modeling '89. Arlington, Va., June 5-7 — Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

Data Communications Concepts. New York, June 5-7 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

On-Line Transaction Processing Symposium. Boston, June 5-7 — Contact: Digital Consulting, 6 Windsor St., Andover, Mass. 01810.

Personal Computing Conference: Implementing the User Workbench. Monterey, Calif., June 5-7 — Contact: Ashley Pearce, Gartner Group, P.O. Box 10212,

Stamford, Conn. 06904.

A/E/C Systems '89 Computer and Management Show for the Design and Construction Industry. Anaheim, Calif., June 5-8 — Contact: A/E/C Systems '89, P.O. Box 11318, Newington, Conn. 06111.

AIM Show and Conference. San Francisco, June 5-8 — Contact: Association for Information and Image Management, Suite 1100, 1100 Wayne Ave., Silver Spring, Md. 20910.

Intelligent Mapping '89: A Conference on Computer Software and Hardware Used for Geographic Information Systems. Anaheim, Calif., June 6-8 — Contact: AIM Group, Suite 425, 11956 Bernardo Plaza Drive, San Diego, Calif. 92128.

Network Computing Forum. Ann Arbor, Mich., June 6-8 — Contact: NCF Headquarters, Suite 525, 101 N. Main St., Ann Arbor, Mich. 48104.

Computer Security Workshop. New York, June 6-9 — Contact: The International Association for Computer Systems Security, 6 Swarthmore Lane, Dix Hills, N.Y. 11746.

Impact of Information Technology on Financial and Information Systems Management. Bedford, Mass., June 7 — Contact: Society for Information Management, Boston Chapter, P.O. Box 116, Newton Lower Falls, Mass. 02162.

Society of Manufacturing Engineers Educational Clinic. Los Angeles, June 7-8 — Contact: Society of Manufacturing Engineers, One SME Drive, P.O. Box 930, Dearborn, Mich. 48121.

Systems 3X Expo. Marlboro, Mass., June 7-8 — Contact: Systems 3X Expo, 27 Congress St., Salem, Mass. 01970.

Hardware Resource Planning. Chicago, June 7-9 — Contact: The Institute for Information Management, P.O. Box 361556, Milpitas, Calif. 95035.

Small Computer Systems Conference. Monterey, Calif., June 7-9 — Contact: Gartner Group, P.O. Box 10212, 56 Top Gallant Road, Stamford, Conn. 06904.

Electronic Data Interchange Conference. Washington, D.C., June 8-9 — Contact: Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

Managing Technology as a Strategic Resource. Pasadena, Calif., June 8-9 — Contact: California Institute of Technology, Industrial Relations Center, 1-90, Pasadena, Calif. 91125.

NCGA Arts Conference. San Jose, Calif., June 8-10 — Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

JUNE 11-17

MACIS — Managing Apple Computers in Information Systems. Chicago, June 11-13 — Contact: Mary Jo Rasmussen, MACIS, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Expert Communication '89. San Francisco, June 11-14 — Contact: Graphic Communications Association, Suite 604, 1730 N. Lynn St., Arlington, Va. 22209-2085.

ICI '89 Annual Conference. Dallas, June 11-14 — Contact: Ellen Snoyer, 3230 Commander Drive, Carrollton, Texas 75006-2507.

National Prime Users Group Conference. Anaheim, Calif., June 11-16 — Contact: NPUG, P.O. Box 697, Laurel, Md. 20707.

Business Opportunities in Rural Telecommunications. Arlington, Va., June 12-13 — Contact: Suzanne Wood, P.O. Box 1455, Alexandria, Va. 22313-2055.

CICS: Managing Availability and Performance. St. Louis, June 12-14 — Contact: Technology Transfer Institute, 741 Tenth St., Santa Monica, Calif. 90402.

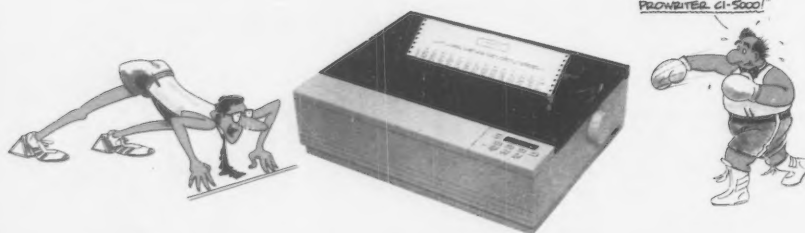
Computer Graphics for Design. New York, June 12-14 — Contact: The Center for Computer Graphics for Design, 45 Stephenson Terr., Briarcliff Manor, N.Y. 10510.

International Trade and Computerization Conference & Exhibition. Washington, D.C., June 12-14 — Contact: Eugene A. Hemley, Executive Director, NCITD, Suite 205, 350 Broadway, New York, N.Y. 10013.

Seminars and Conference Object-Oriented Programming (SCOOP). Boston, June 12-14 — Contact: The Wang Institute of Boston University, Corporate Education Center, 72 Tyng Road, Tyngboro, Mass. 01879.

Personal Computer Conference. Toronto, June 13 — Contact: International Data Corporation Canada, Suite 1000, 7 King Street E., Toronto, Ont., Canada M5C 1A2.

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PRODUCT SPOTLIGHT

PRINTERS AND PLOTTERS

Users stay cool amid whirl of options

BY JOHN WEBSTER

No two ways about it, printer purchasers are a hard lot to tempt. Manufacturers keep coming up with tasty new concoctions and exotic side dishes to whisk in front of them, and they will ooh and aah in appreciation of the R&D feats, inquire about the price and then move on to plainer and more proven fare. "Take out some of the price points," they say, "and prove that its resolution is better than what you turned out yesterday and maybe we'll take a bite. Until then, we'll pass."

If you are looking for an equivalent, think in terms of iron-willed dieters, bargain outlet shoppers and hard-core consumers.

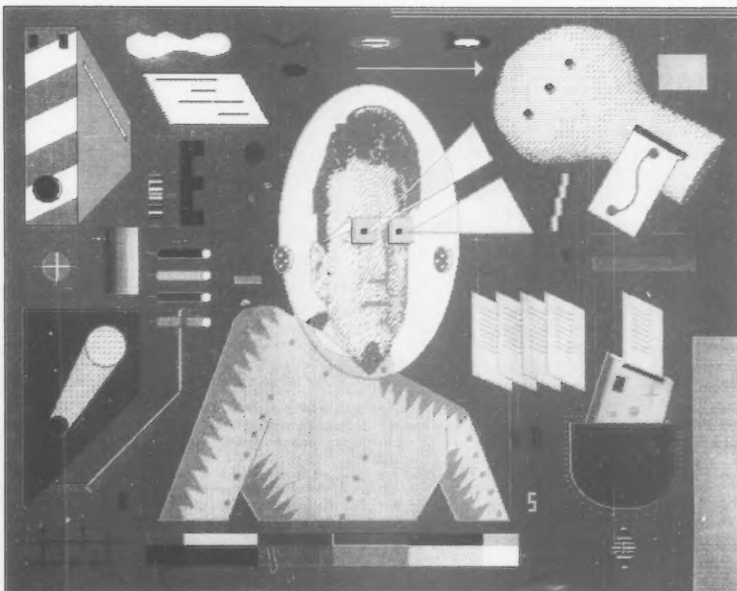
Consider ink-jet technology. Some industry analysts see ink-jet as a rising star. It may very well be, but stars in this particular area do not shoot so much as edge toward acceptance.

Ink-jet technology has a lot going for it in terms of both quality and price. These printers are a "good alternative for users who want laser quality, but don't want to spend a lot of money," according to Keith Kmetz, a market analyst at BIS CAP International, Inc., in Norwell, Mass.

With an average price tag of around \$1,000 for solid ink-jet technology, high-resolution and color potential, ink-jet units in the 300 dot/in. range are beginning to make an appreciable dent in the 24-pin dot matrix market. But it has, after all, been 10 years since the first office ink-jet printer hit the market, and even now, its success is not quite locked in.

Some problems do linger,

Webster is a Boston-based free-lance writer.



JOHN WEBSTER

such as the tendency for images to bleed on plain paper, often requiring special clay-coated stock to maintain image quality. So knowing the quirks of the marketplace, most analysts, including Kmetz, confine themselves to saying that this is a technology that bears watching.

In the meantime, potential buyers are winning more options by playing the waiting game. Manufacturers of printers employing other page printing tech-

nologies — primarily laser, LED and liquid crystal shutter — are pushing for higher resolutions in their print engines.

Canon recently improved the laser printer resolution standard by demonstrating a 400 dot/in. engine, which should be available in a printer in the future. Industry heavyweights Hewlett-Packard Co. and Apple Computer, Inc. will soon be testing these waters with 400 dot/in. laser printers, according to Steve

Terry, co-director of the research center at Electronic Directions, a desktop publishing consulting firm based in New York.

Printer manufacturers claim that resolutions as high as 600 dot/in. will be commonplace in about three years, but such products will require reworking the printer engine. Currently Varityper and Printware, Inc., among other companies, are tweaking the Canon engine for 600 dot/in. output, but the compromise is dot-placement accuracy, according to Donald Parker, vice-president of products and technology at QMS, Inc. in Mobile, Ala.

"The [current] photosensitive materials forming the drum surface have a minimum charge they can support, and the toner itself has to be much finer than what is found in print today,"

INSIDE

Old Faithful

Pen plotters lose steam but still draw dependability fans. Page 54.

High Gear

Speed may be the least of high-volume printer users' concern. Page 55.

More Than a Pretty Face

True network printers need the basics — and then some. Page 56.

Parker explains.

The quest for higher quality is not limited to nonimpact printers. Impact printers, facing the encroachment of nonimpact printers into traditional impact territory such as heavy-duty report processing and other high-volume work, are rising to the challenge by trying to match the quality of the nonimpacts.

Now that 24-pin printers have taken a firm hold on the dot matrix market, there is some speculation that higher pin counts may emerge. For example, a 48-pin printhead was introduced by Epson in Japan earlier this year. The prevailing thought around the industry, however, is that 48 pins may not offer enough benefits to outweigh the accompanying increase in cost.

Angele Boyd, manager of printer research at International Data Corp. (IDC) in Framingham, Mass., explains that the quality will have to be "almost laser-like" and the price much lower in order for 48-pin dot matrix printers to make a heavy impact on the market.

One method being developed by dot matrix printer manufacturers to produce better print quality is a dual-pass, double-density mode for 24-pin models.

"We'll start to see 'super letter quality'; it will be the next level and come very close to laser quality," says Charles Kappeghian, director of impact printer product marketing at Okidata Corp.

In general, impact printer manufacturers will attempt to lure buyers with enhancements to existing technology, because "there's not a whole lot of breakthrough left" in the dot matrix category, BIS CAP's Kmetz explains. Paper-handling features such as paper parking and different types of paper feeds, which were considered options at one time, will become requirements.

Color me tentative

The market for color output continues to improve, albeit slowly. Exceptional color quality is still beyond the reach of many office budgets, but splashes of color are appearing more frequently in office documents.

In the last year, color has become more accessible — at least technologically — as ink-jet, dot matrix and laser color printers have come onto the market. In addition, improvements such as dye-diffusion thermal transfer and solid ink-jet have allowed those technologies to take off. But while resolution is not always a problem, cost and speed usually are.

Even though color output is becoming more of a technological reality in the office environment, many users are still holding out for higher resolutions and

a wider range of color at an affordable price.

"I don't think anybody argues that there is a need for color... but what's out there doesn't offer high enough resolution. [Ideally], color output should be at least 600 dot/in. or more," says Simon Goldstein, assistant vice-president in the information resources department at Citicorp in New York. Goldstein's group uses Apple Macintoshes and two HP printers — a Thinkjet and a Laserjet Series II — as well as an Apple Laserwriter Plus for everything from systems update bulletins and product plans to basic internal communications, including a newsletter.

"Color is not a real key issue for us right now. Even at 300 dot/in., if you look at a color image you can see the red dot next to the blue dot, which makes purple. It will be a couple of years before software and any high-quality output is available" to a general office, adds Kate Schwinghammer, manager of microcomputing at Crown Publishing, a division of Random House, Inc. in New York. Crown Publishing is generating internal track reports and some memos off of IBM Personal System/2s and 3270 PCs using a Laserjet II as well as a number of Panasonic and Epson dot matrix printers.

Industry observers agree that ink-jet technology will emerge as the standard solution to affordable color hard copy, at least at the low end of the printer spectrum.

HP's Paintjet, for example, brings inexpensive color output to the desktop. However, the printer's graphics resolution is only 180 dot/in. and takes 3½ minutes to print a full-page image, compared with the fraction of a minute generally needed to print black-and-white text. Other ink-jet printers can take up to four minutes to print a full page of color graphics. Some users in search of color balk at such plodding print speeds.

"We looked at ink-jet printers but they were fairly slow, and we

years ago," points out Bruce Enix, chief engineer at Eastman Kodak Co. in Dayton, Ohio. "Color printing at the PC level will be driven by the acceptance of color copiers. Printing multiple copies won't go over in the office environment" because it is slow, he added.

But despite these problems, a look at sales projections during the next several years upholds the notion that color hard copy is on the upswing. In 1989, according to Infocorp, color devices will

Another development that may anchor the color printing market is Mead Imaging's Cyncolor, which is a progression of microencapsulation found in carbonless paper. Cyncolor film contains billions of microcapsules, called cylihts, sensitive to color lights and intensity. After the film is exposed to colored light, the cylihts sensitive to that particular color harden. The film is then pressed against a receiver sheet by pressure rollers, and the softer cylihts burst, transfer-

an advantage in that it works with any printer.

Printer-specific processors focused at the Postscript market will also accelerate bit-map processing. Chips from National Semiconductor Corp., Cirrus Logic and Western Digital Corp. provide "a lot of on-board logic to facilitate rasterization and bitblts [block pixel transfer]," says David Hudson, a BIS CAP industry analyst. Instructions added in hardware rather than software enhance processing speed.

"The most important development in the nonimpact area will be increasing the performance of Postscript printers, primarily from clones. Better processors [building on the foundation] of the Weitek and Motorola, Inc. 68000 will lead to lower prices," says William Hall, senior product planner at Genicom, Inc.

The upcoming release of HP's Printer Control Language (PCL), which offers page composition functions but lacks Postscript's inherent intelligence, will add font-rendering capabilities to PCL, bringing it a step closer to Postscript.

Font compatibility has long been an issue in the Postscript clone market, but Hall does not see it as a major obstacle unless users want to add fonts to the set provided with a Postscript clone. "If [users] want only Adobe fonts, then that's a problem, but the 35 fonts that most [clones] provide are enough," he says.

Standard setting

The industry tussle over font compatibility may be settled by Microsoft Corp.'s selection of one specific vendor's page description language technology for IBM's OS/2 Presentation Manager, an announcement that is expected to be made this June.

"Everyone is trying to get Microsoft to settle on their own font technology. The Macintosh world has settled on Adobe, as has Unix. Whatever gets plugged into Presentation Manager will dominate the PC world and become a standard. Microsoft has said, 'Yes, we're going to pick someone, but it has to be an open language — something printer companies have access to,'" QMS' Parker explains.

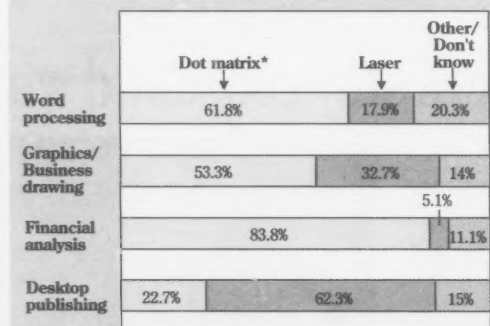
A recurring concern voiced by users is a desire for more memory, particularly for storing fonts. "We put 2M bytes of expanded memory in the Laserjet II, and most of the fonts still have to be loaded through software. We'd love to see more fonts and memory offered standard," says Jamie Snedaker, a systems analyst at Banker's Trust in New York.

Most laser printers offer 512K bytes of standard memory. However, most users seek out more in the range of 2M bytes for font storage and enhanced processing speed.

"One thing we're finding with

All talk, no action?

Laser printers may own the newer desktop publishing market, but they have yet to make inroads in traditional printer applications



*Includes 9-, 18- and 24-pin machines.

SOURCE: INTERNATIONAL DATA CORP.

CW CHART: DOREEN DAHL

account for 10% of ink-jet printer sales, 18% of thermal transfer printer sales and 21% of serial dot matrix printer sales.

Looking ahead to 1992, Infocorp estimates color printers will make up 15% of the ink-jet installed base, 23% of the thermal transfer installed base, and 31% of the serial dot matrix printer base.

While printing a limited number of color pages has proven viable with ink-jet and thermal transfer technologies, affordable color laser printers are barely visible on the horizon. Although lasers are not out of the running in the color printing derby, users will most likely have to settle for no more than two- or three-color images.

"There is the possibility of having two stations to produce two colors on letterhead, but the real push is to do it all on a single photo-receptor with two or three toner baths. There's a lot going on in Japan right now

with that. They're creating drums with three charge levels, but we won't see them [in the U.S.] for three years or so," according to Peter Steiner, president of Office Automation Systems, Inc. in San Diego.

The three-toner station method is expensive and causes more paper jams, but it is being refined for a push into the market in several years, according to other industry watchers.

ring the dye.

Because of the costly components required in a color laser printer, the Cyncolor's paper-based technology of appears to be more attractive to printer users. "I think something like Cyncolor makes a lot more sense than color lasers," says Harry Shapiro, a programmer/analyst with the graphic and print communications group at Shearson Lehman Hutton, Inc., a division of American Express Co. in New York. Using a Macintosh II and Dataproducts and Linotype printers, Shapiro's group produces weekly and monthly commodity reports for the company's financial consultants.

The big news in the Postscript market is that clones are finally shipping. Software-based host-resident Postscript clone controllers with a dedicated processor, such as products manufactured by Conographic Corp. and Destiny Technology Corp., and printer-resident clones offered by Qume Corp. and Newgen Systems Corp. are making a splash simply because they are available to end users after a long period of anticipation, according to Naomi Cameron, associate director of research at BIS CAP (formerly Datek Information Services) in Waltham, Mass.

Computer Associates International, Inc.'s Freedom of Press color Postscript clone is in a slightly different category because the host processor handles the image rasterization. While it is slower than a hardware-based product, Freedom of Press has

EVEN THOUGH color output is becoming more of a technological reality in the office environment, many users are still holding out for higher resolutions and a wider range of color at an affordable price.

weren't pleased with the color quality," says Glen Raines, senior resource analyst at Federal Express Corp. in Memphis. Raines' operation prints "mainly overheads" with graphics and bulleted items on a Laserjet II. The company is beginning to explore its color options for enhancing presentation material.

"Although color printing is gaining ground, it's not at the stage that lasers were at a few

fonts becoming available in floppy disks is that memory is a key issue. It has been addressed, but not a great deal yet. Some printers have built-in hard disks for storing fonts," says Michael Kless, president of Publishing Solutions, Inc., a desktop publishing consulting firm in New York.

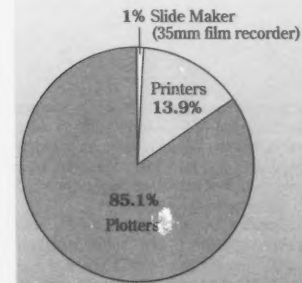
"I doubt many laser printers are shipped with less than 1M byte of memory, and most users bring it up to 2M bytes," says Ed Pullen, director of printer market research at Infocorp in Santa Clara, Calif. Some printer manufacturers may begin to add either 500K or 1M bytes of static random-access memory at a slightly lower price than dynamic RAM and build on that, he adds. The inherent problem with storing fonts on hard disk is the lengthy access time. More on-board memory would provide a speedier option to enhanced font capabilities.

Control issues

Until recently, the controller, which creates the bit map to print out the image, resided in the printer itself. But Ricoh Corp. and other manufacturers have introduced the so-called "dumb" printer: The printer controller resides in the PC or other host

Color my world

While almost half of respondents say they are using a color output device, few indicate printers as their device of choice for color



SOURCE: INTERNATIONAL DATA CORP. CW CHART: DOREEN DAILEY

system, and data travels via a video cable through a video port to the printer.

The industry is debating the virtue of host-resident controllers, but the trend has obvious advantages. Because the controller uses the host's power supply, cost is tempered. Users may also store more fonts on the hard disk in the host computer, BIS CAP's Cameron says.

On the downside, the controller ties up a valuable expansion slot. Also, Postscript use is currently most heavily concentrated in the Macintosh market, and there are no Mac-compatible host-resident Postscript controllers available. "Clumsy" keeps popping up in user feedback on the controllers as well, Cameron adds.

Pullen says the biggest breakthrough host-resident controllers offer is flexibility. "The advantage to this type of setup is that VARs or users can add more memory to speed processing or add fontware independently of the printer," he explains.

Other market watchers view host-resident controllers with less enthusiasm. While conceding that it is an interesting technological approach, some analysts indicate that the sheer number of printer controllers on the market may intimidate users. "Users might be confused: There are about 40 controller choices, although not every dealer would offer all of them. And there are newer engines out there [than the Ricoh engines]," Cameron says.

The real breakthrough, according to

THE INHERENT problem with storing fonts on hard disk is the lengthy access time. More on-board memory would provide a speedier option to enhanced font capabilities.

Pullen, will be a controller that resides in the printer, but acts independently of the host. "Users could put one in a plotter or Postscript printer and get to it from any number of workstations without dedicating a PC to it," he says.

A more complicated type of controller for graphics data, the Raster Image Processor (RIP)-type interfaces, have proven to be robust graphics command accelera-

tors. However, many analysts say standard printer controllers residing in the host system are actually inherently slower, even though data is theoretically transferred to the printer at the host's bus speed. Some analysts also say that users will wonder whom to contact in the event of a technical mishap.

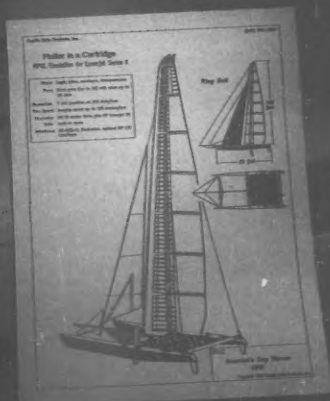
Host-resident Postscript or compatible controllers that act as a RIP (as op-

posed to a basic printer controller) have proven to be valuable tools when it comes time to process page description data.

"I like the RIP technology in terms of speed. With [Adobe] Display Postscript and [Microsoft's] GPI coming out, the external RIP-type controllers will be a good performance solution," Shearson Lehman's Shapiro says.

Vendors are jostling for the lead in a fiercely competitive industry marked by an array of printing technologies, print speeds and product prices. Industry watchers and participants foresee a continuation of still-evolving market trends and the birth of several others over the next few years, all of which will streamline the process of outputting words and images on paper and other media. ●

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Dull, but death-defying

BY JOEL N. ORR

Pen plotters are the workhorses of the graphical output market and, as any farmer will attest, such animals have long, productive lives.

Analysts have been predicting the demise of the pen plotter for more than five years, but, while not showing any great growth, the market has refused to yield to

Orr, a CADD/CAM and computer graphics consultant and author, is chairman of Orr Associates, Inc. (OAI) in Great Falls, Va.

their predictions. Year in and year out, pen plotters continue to provide clear, concise graphical renderings to a small but stable market. Dan Miller, a printer market analyst at Dataquest, Inc., reports that the overall pen plotter market for 1988 was 272,500 units — a 12% gain over 1987. This year, he says, no real gain is expected, but unit shipments will remain steady at the 1988 level.

Pen plotters are complex electromechanical devices that move a pen and a

piece of drafting medium relative to each other. They were the first graphical hard-copy output devices; an analog version called a chart recorder was first used in the 1940s. Digital pen plotters were popularized in the 1950s.

The largest group of pen plotters is the tabletop units, which produce color overhead transparencies in relatively small quantities for business presentations.

The large-format pen plotters — those capable of producing output 22 in. by 34 in. (D-size) or greater — are bought primarily by engineers and architects to use with their computer-aided design and drafting (CADD) systems. When CADD came to microcomputers in 1985, it started a period of unprecedented growth for the pen plotter market by reducing the

price of a CADD "seat" from \$100,000 to \$10,000 in a single year. With CADD systems so affordable, users needed output devices — and pen plotters were the only machines that could fit the bill.

Pen plotters often have multiple-pen holders that support drafting or roller-ball pens and felt- or fiber-tip markers of different colors and thicknesses. One Japanese firm, Mutoh Industries Ltd., offers a plotter that can use pencils as well as pens. These holders are sometimes mounted on the plotting head or on a non-moving part of the plotter. In the latter case, the pens are extracted and replaced by the moving plot head.

The advantages of pen plotters over other graphical output devices are straightforward: Color and large formats are relatively inexpensive, and lines are smooth. On the other hand, they are slow and cannot operate unattended.

Life has become simpler and faster for pen plotter users since the early drum and flathead devices. For instance, the bane of the pen plotter has always been the pro-

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ANALYSTS HAVE been predicting the demise of the pen plotter for more than five years, but the market has refused to yield to their predictions.

pensity of the pens to dry out without warning. Various devices, such as automatic capping mechanisms and sophisticated sensors, now keep the pens from drying out and inform the operator when it is time to change pens.

To speed up plots, some plotters offer optimizing buffers. The buffer is simply digital memory for holding the plot file, which frees the computer for other work. A typical D-size engineering drawing might take 30 minutes to plot but only two minutes to transfer into a buffer.

Optimization can be built into firmware, which sorts the plot commands to minimize the total motion and the number of pen changes required. Some CADD packages also provide plotter optimization software. Rearranging the plot order of the lines by means of these programs can save as much as 40% of the plot time.

Five years ago, the cheapest production D-size plotters cost \$16,000 or more. Today, the most popular units — from Hewlett-Packard Co., Calcomp, Inc. and Houston Instrument, Co. — are priced around \$5,000; low-end models are available for less than \$2,500.

Photoplotters, a variation on the pen plotter theme, use a beam of light to "draw" on photographic film in a dark chamber. Typically slow, precise and expensive, these machines create masks that are used in manufacturing printed circuit boards and integrated circuits.

The ability of the moving plotter head to carry something other than a pen has been utilized in a number of interesting applications. Gerber Scientific Instruments Co., a pioneer in the plotter business, makes plotters that cut out vinyl letters with a knife for signmakers; it also makes units that cut multiple layers of cloth with a saber saw.

Connecting plotters to computer systems can be a challenge because there are

Continued on page 62

Creativity marks shift in use of high-volume printers

BY ALAN RADDING

The market for high-volume printing devices is changing. Even the definition of what constitutes high volume is being re-evaluated as new users and uses emerge.

The two major applications for high-volume printers were internal data dumps and repetitive forms printing, such as the preparation of statements and invoices. Today, many users are finding that their needs are shifting, and analysts say they are seeing this class of machine applied in original ways by a wider variety of users. These shifts in market demographics and use are shaking the high-volume market right down to its roots.

High-volume printers are turning out everything from customized and graphically embellished versions of standard forms to mass memos. Some themes do run strongly through these applications, however — capacity, format flexibility and graphics capability are major factors shifting the market away from impact printers, which have always dominated the high-volume market, toward alterna-

tive technologies such as laser.

According to Naomi Cameron, associate director of research at BIS CAP International (formerly Datek Information Services) in Waltham, Mass., impact printers continue to outsell laser printers in the high-volume arena, but such comparisons are misleading because it takes more line printers to do the same job.

The numbers for 1988 show that 5,000 high-volume lasers were shipped vs. 35,000 line printers, Cameron says, but, even so, the real trend is away from line printers and toward lasers.

Getting more with less

In 1987, for example, Bright Bank Savings Association in Dallas replaced seven IBM 3203 line printers with two Siemens Information Systems, Inc. 2300 laser printers. "We had a capacity problem and were looking at adding one more printer, which also meant adding another operator," explains Jim Hilbun, senior vice-president/production services at the bank's computer services division.

The problem was in the tight, five-hour time frame the bank had to print the

mortgage processing reports — approximately one million lines every night. By switching to the laser printers, the bank did the same job with hours to spare.

It would have been cheaper in terms of purchase price to buy another line printer, but Hilbun says that he found other ways to look at the cost of a printer. With the line printers, the bank used four-part forms that cost \$32 per thousand sheets. The laser printers use plain paper that costs \$4 per thousand sheets. "If we run four sheets through the printer [to one the old way], that's still only \$16 — a savings of half," Hilbun points out.

The bank let leases expire on three line printers, sold two others it owned and gave the remaining two printers to other departments that would have bought new line printers. If the bank were going through this exercise in 1989, however, Hilbun surmises that it would probably retire the line printers altogether because "now there are new, small laser printers that would do the job."

At Charles Stark Draper Laboratory, Inc. in Cambridge, Mass., which represents an extreme example of the new style in high-volume printer use, lasers did not displace line printers. Instead, they have made the office copier obsolete.

Draper's four high-volume printers — two IBM 4050s and two Xerox Corp. 3835s — are available to virtually every user on the system. They produce all the printed materials the research institute generates, from thousands of copies of three-page memos to 10 copies of a 20-page research report.

Felsa Satlow, a member of the lab's technical staff, says the high-volume printers have become the standard method for producing any printed document, chiefly because of the print quality and graphics capabilities. "Nobody uses a copier anymore," she says.

Using a mix

Draper is in the mainstream of high-volume printing trends in one respect. Instead of buying one very high-speed machine, the lab uses a mix of IBM and Xerox printers ranging from 20 page/min to 88 page/min to handle cut-sheet and continuous-form printing.

While models are available that run in excess of 200 page/min, the trend among high-volume users is toward slower printers, Cameron says. The real high-volume market encompasses machines that run between 50 and 80 page/min or more, but machines running as slow as an even 50 page/min can legitimately claim a place.

Graphics capability is becoming a real hot button for many users. The growing interest in graphics is being fueled by regulatory requirements and the push for competitive advantage. At American Express Travel Related Services Co. in Phoenix, the use of 15 Xerox 9790 laser printers to produce facsimiles of charge card slips that are mailed out to members along with their bills is one example of how graphical capabilities can provide a company with a unique selling point.

Analysts are not convinced that today's high-volume printers can run

Continued on page 62

Radding is a Newton, Mass.-based author specializing in business and technology.

Magnetography fires up utility

Traillblazing was not what systems personnel at Bay State Gas in Canton, Mass., had in mind when they set out to improve the natural gas utility's printing operations in 1988. What Brian Mulloy, manager of technical services, and Al Littizzio, manager of computer operations, were most concerned about were capacity, format flexibility and price.

Littizzio says he was worried that the 2-year-old Unisys Corp. 9246-21 train-style impact printer was already at its 2,000 line/min capacity, working six hours every night to print an average of 15,000 invoices and notices.

Load-handling ability was not the only factor involved in investing in newer technologies, however. Graphical versatility, necessitated by the inconsistencies of different states' regulations, was also a consideration.

Although these were ample reasons to look for an alternative, finding one was not simple. Any replacement would have to interface with Bay State's Unisys mainframe and use fan-fold, continuous-form paper compatible with the company's insertion equipment. It would also have to cost no more than \$125,000, which was all Bay State could spend.

Mulloy and Littizzio set up a detailed review process that looked at factors like output quality, flexibility, ease of operation and resource consumption. The primary concern, however, was reliability. "We weren't go-

ing to buy two, so we wanted to know it was reliable, that it would be fixed fast and that there were provisions for a backup," Littizzio says.

Although at first the two assumed their answer would be a laser printer, that avenue dead-ended repeatedly. The search broadened to include less well-known alternatives such as LED and magnetographic printers.

Even now, magnetography, a low-cost electromagnetic alternative to laser printing, is a relatively unknown technology. Bay State had only two choices for vendors, one of which, KCR Technology, Inc., had yet to ship its first printer.

Still, both Mulloy and Littizzio were sufficiently impressed to take a chance on the second vendor, Bull Peripherals Corp., which offered a track record of 30 installations, the promise of rapid service and backup machines.

The Bull MP6090, which Bay State purchased for \$93,000, including a fast, third-party printer interface for the Unisys mainframe, has been in place for just over a year now. Some gains were apparent from the outset, such as the fact that the new unit, which operates at 90 page/min, can handle what had been a six-hour nightly job in a little more than two hours.

The Unisys printer has not retired, however; it has been sidelined to less strenuous duty — handling the company's heat-seal forms, a task the Bull machine cannot perform.

ALAN RADDING

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The right stuff for LANs

BY MICHAEL WEISS

A major difference exists between local-area network printers and printers that just happen to be located on a network. Right now, most of the printers operating on LANs are single-user devices that are being utilized on the network by default, because few printers on the market have been specifically designed for networked environments.

Weiss is vice-president and senior analyst at Infonetics, Inc. in Santa Clara, Calif.

Although users have been getting by up until now, the need for printers targeted specifically for network use is becoming more and more apparent. Printing in the personal computer LAN environment is currently one of the fastest-growing printer market niches in the U.S. Market research firm Infonetics, Inc. estimates that more than 700,000 printers will be installed on new PC LANs in 1989.

There are, of course, many areas in which the criteria for network printers

overlap those for single-user units. In some instances, however, characteristics that are desirable in any printer become much more critical in a product meant for networked use.

Ease of use, for example, becomes more important because networks and network printer configurations are often difficult to install, troubleshoot and maintain.

Speed and work-load capability are particularly critical characteristics users look for. The fastest printers working on today's networks are based on the Motorola, Inc. 68020 chip or reduced instruction set computing architecture.

In order for it to be really effective, however, a network printer should actually be capable of working twice as fast as

these types of products.

Duty cycles are also a matter of concern in network use. A number of 15 page/min. devices currently offered on the market offer 25,000 page/month ratings. This volume should become standard.

Paper handling is another area in which network use dictates more ambitious design. With more and more people using the printer, it is even more important to satisfy their varied requirements for both input and output. Users are currently asking for a minimum of two paper trays, each with a 200- to 500-page capacity, and they will probably want more next year.

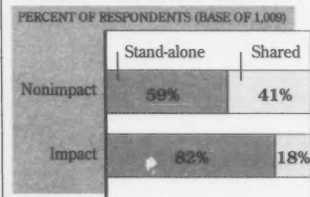
Beyond the familiar

However, network printer requirements go beyond these similarities. Today's printers must offer sufficient functionality and enough intelligence to support multi-user requirements.

As print servers, network printers re-

Share and share alike?

Nonimpact PC printers are shared more often than impact models. Lasers in particular are shared at more than half of surveyed sites.



SOURCE: INTERNATIONAL DATA CORP.

CW CHART: JOHN YORK

quire intelligence adequate for functions such as queuing, printer recovery, error messaging and centralized spooling as well as bidirectional communications and error messaging.

In addition, they need to be compatible with network operating systems, imaging models and communications protocols within a wide variety of network environments.

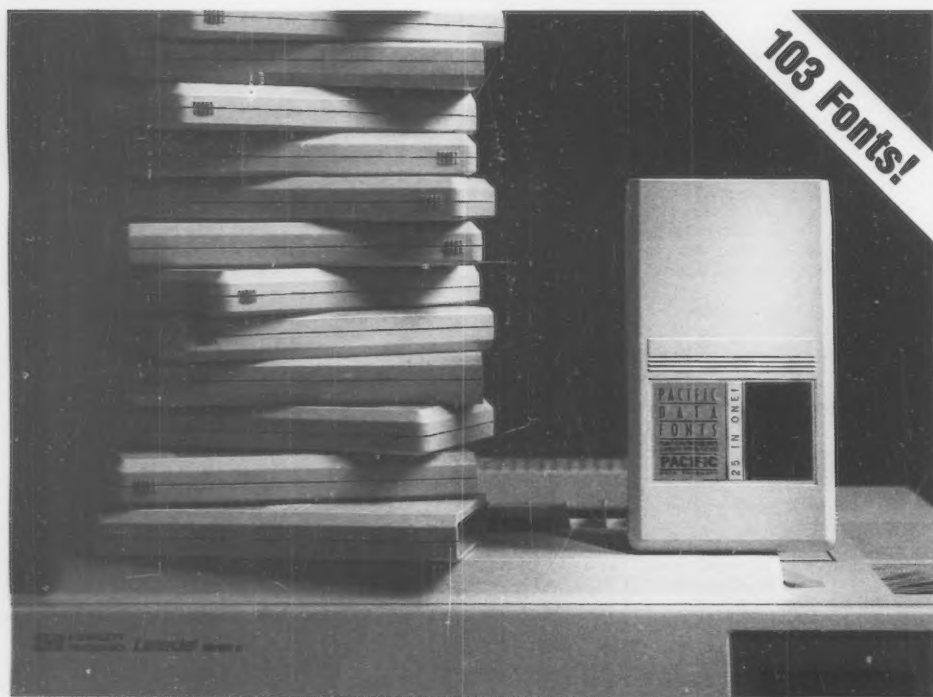
Bidirectional communications between the printer and the computers on the network is especially important. PC LAN users should be able to monitor the status of the printer and check on their print jobs without having to leave their computers.

In the future, users should have the capability to read the status of the printer on a control panel and also receive bidirectional communications from the printer to the screens of the stations on the network.

Other features and functions that are important to a significant number of LAN users include queue manipulation, forms and font handling and individualized format settings.

Most of these functions are not yet available in desktop-type printers, and few can be purchased for less than \$10,000. As a consequence, network users either have to do without or settle for a software-based solution. Some third-party application and utility software and network operating systems can handle some of these tasks.

Neither route represents an ideal solution or one that will suffice for long. The future of network printers will be spurred on not only by user needs but by the growing sophistication of the networks themselves. •



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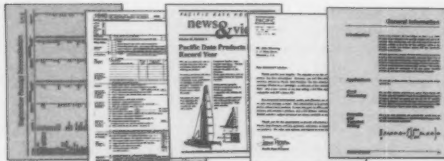
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 E. Office Automation Systems
 F. No Computer Involvement

- 1. BUSINESS INDUSTRY** (Circle one)
 10. Manufacturer (other than computer)
 20. Finance/Insurance/Real Estate
 30. Medicine/Law/Education
 40. Wholesale/Retail/Trade
 50. Business Service (except DP)
 60. Government — State/Federal/Local
 65. Communications Systems/Public Utilities/Transportation
 70. Mining/Construction/Petroleum/Retailing/Agric.
 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
 85. Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
 90. Computer Peripheral Dealer/Distributor/Retailer
 95. User/Other _____
 (Please specify)

- 2. TITLE FUNCTION** (Circle one)
15. MIS/DP MANAGEMENT
 19. Vice President/Asst. VP
 21. Dir. Mgr. Suprv. IS/MIS/DP Services
 22. Dir. Mgr. Suprv. of Operations/Planning/Adm. Services
 23. Dir. Mgr. Suprv. Analyst of Systems
 31. Dir. Mgr. Suprv. of Programming
 32. Programmer/Methods Analyst
 35. Dir. Mgr. Suprv. QA/WP
 38. Data Comm. Network/Systems Mgt.

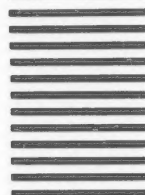
- OTHER COMPANY MANAGEMENT**
 11. President/Owner/Partner/General Mgr.
 12. Vice President/Asst. VP
 13. Treasurer/Controller/Financial Officer
 41. Engineering/Scientific/R&D/Tech. Mgt.
 51. Sales/Mktg. Mgt.

- OTHER PROFESSIONALS**
 60. Consulting Mgt.
 70. Medical/Legal/Accounting Mgt.
 80. Educators/Journalists/Librarians/Students
 90. Others _____
 (Please specify)

- 3. COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor or consultant:
 A. Mainframes/Supermains
 B. Minicomputers/Small Business Computers
 C. Microcomputers/Desktops
 D. Communications Systems
 E. Office Automation Systems
 F. No Computer Involvement



NO POSTAGE
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IN THE
UNITED STATES



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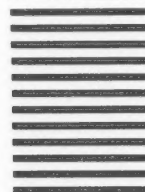
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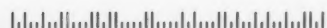
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COMPUTERWORLD

P.O. Box 2044
Marion, Ohio 43306-2144



Laser printers: 10 page/min and up

COMPANY	PRODUCT	DIMENSIONS (INCHES)	ENGINE	PRINT SPEED (PAGE PER MINUTE)	DUTY CYCLE (PAGE PER MONTH)	AMOUNT ON-BOARD MEMORY (MEGABYTES)	RESOLUTION (DOT PER INCH)	EMULATIONS	PAGE DESCRIPTION LANGUAGES SUPPORTED	NUMBER OF HARDWARE FONTS/OFFERS SUPPORT FOR SOFTWARE FONTS	NUMBER OF FONTS PER PAGE	RESIDENT MACROS FOR FORMS	MAXIMUM INPUT SHEET CAPACITY	COLLATING	ENVELOPES/LABELS	NOISE LEVEL (db)	MOST TYPICAL USE	PRICE
Advanced Technologies International (408) 942-1780	LC-6026	16 x 27 x 24	Dataproducts 2600	26	100,000	4	300 x 300	Diablo 630, Epson FX-80, HPGL, HP Laserjet Plus, Tektronix, fast bit image, proprietary	Proprietary	64/Yes	*	Yes	500	Optional	Labels	55	High-speed text and graphics printing	\$24,900
	2670/DW-2	16 x 27 x 24	Dataproducts 2600	26	100,000	768K	300 x 300	Diablo 630, Epson FX/MX-80, HP Laserjet, Quume Sprint II, NEC Spinwriter, ANSI 3.64	NP	8/Yes	*	Yes	500	Optional	Labels	55	Office automation	\$17,995
	2670/DW-3	16 x 27 x 24	Dataproducts 2600	26	100,000	2	300 x 300	Diablo 630, Epson FX/MX-80, HP Laserjet Plus, HPGL, Tektronix, fast bit image	Proprietary	10/Yes	10	Yes	500	Optional	Labels	55	Office automation	\$17,995
	2670/GR-2	16 x 27 x 24	Dataproducts 2600	26	100,000	2	300 x 300	Verastec V-80	None	NA	NA	No	500	No	No	55	Graphics	\$17,995
	1570/DW-2	16 x 22 x 19	Ricoh LP4150	15	15,000	768K-1.2M	300 x 300	Diablo 630, Epson FX/MX-80, HP Laserjet, Quume Sprint II, NEC Spinwriter, ANSI 3.64	Proprietary	*/Yes	*	Yes	500	Optional	Labels	55	Office automation	\$8,495
	1570/DW-3	16 x 22 x 19	Ricoh LP4150	15	15,000	2	300 x 300	Diablo 630, Epson FX/MX-80, HP Laserjet Plus, HPGL, Tektronix 4014, fast bit image	Proprietary	*/Yes	*	Yes	500	Optional	Labels	55	Office automation	\$7,995
Agfa Corp., Compugraphic Division (508) 638-5600	P400 PS	40 x 50 x 21	NP	18	10,000-100,000	6	406 x 406	Diablo 630	Postscript	73/Yes	*	No	2,000	Yes	No	55	Office workgroup publishing	\$19,995
	P3400 PS	20.9 x 29.6 x 20.5	NP	12	10,000	4	400 x 400	Diablo 630	Postscript	73/Yes	*	No	500	Yes	No	55	Office workgroup publishing	\$12,500
	Compugraphic 420XL	38 x 28.7 x 25.6	NP	20	30,000	NP	400 x 400	NP	Proprietary	1,700/Yes	*	No	250	Yes	No	57	Imagesetter proofing	\$21,995
Apollo Computer, Inc. (508) 236-0800	Apollo Domain/Laser-26	16.1 x 26.7 x 23.4	Toshiba A740	26	50,000	2.5	300 x 300	Diablo 630	Postscript	13/Yes	*	NP	750	No	NP	55	Word processing	\$25,000-\$27,000
BGL Technology Corp. (805) 987-7305	Mark I	12.6 x 18.9 x 19.4	Dataproducts 1200	12	25,000	2.5-6	300 x 300	HPGL, Laserjet Series II, Tektronix 4010/4014, Verastec, DEC LNO3	Proprietary	35/Yes	*	Yes	750	Yes	Both	55	CAD/CAM	\$5,495-\$6,995
	Mark II	16.1 x 26.7 x 23.4	Dataproducts 2600	20	80,000-100,000	2.5-8	300 x 300	HPGL, Laserjet Series II, Tektronix 4010/4014, Verastec	None	35/Yes	*	Yes	2,000	Yes	Labels	55	CAD/CAM	\$9,995-\$13,645
	Mark III	NP	Dataproducts 2600	26	80,000-100,000	40	300 x 300	HPGL, Laserjet Series II, Tektronix 4010/4014, Verastec	Proprietary	35/Yes	*	Yes	2,000	Yes	Labels	55	CAD/CAM	\$15,995
Bull Worldwide Information Systems, Inc. (817) 895-0000	Model 85	16.6 x 21.3 x 26	Ricoh LP4150	15	12,000	2.5	300 x 300	HP Laserjet Plus, Diablo 630	None	4/Yes	20	No	500	Yes	Labels	55	Office automation	\$6,950
C. Itoh Electronics (800) 227-0315 Ext. 4450	LIPS II	11.1 x 20.3 x 19.1	Konica LP3010	10	15,000	512K-2M	300 x 300	HP Laserjet, IBM Printer, Diablo 630, Epson FX-80	LIPS, LCL	*/Yes	16+	No	250	Yes	No	55	Word processing	\$3,545-\$4,495
CPT Corp. (612) 937-8000	CPT 7200	13.5 x 16.9 x 21.6	Fujitsu RX7200	12	25,000	640K	300 x 300	HP Laserjet Plus, Epson FX-85, HPGL, Diablo 630, IBM Proprietary	NP	2/Yes	12	NP	500	No	Both	50	Workstation page printer	\$3,845
	CPT 7300	12.2 x 19.1 x 20.1	Fujitsu RX7300	18	50,000	640K	300 x 300	HP Laserjet Plus, Diablo 630, Epson FX-80, HPGL	NP	2/Yes	12	NP	500	No	Both	52	CPT image file system	\$7,950
Dataproducts Corp. (818) 887-8000	LZR 1260	12.6 x 18.9 x 19.4	Toshiba A739	12	25,000	4	300 x 300	HP Laserjet Plus	Postscript	35/Yes	*	Yes	250	No	Both	55	Desktop publishing	\$7,995
	LZR 2665	16.1 x 26.7 x 23.4	Toshiba A740	26	100,000	2.5	300 x 300	NP	Postscript	12/Yes	*	Yes	500	Yes	Labels	55	Tabloid output	\$18,700
	LZR 2620	16.1 x 26.7 x 23.4	Toshiba A740	26	80,000	1.5	300 x 300	B-Series Line printer	NP	4/No	1	No	500	No	Labels	55	Bar code/ forms printing	\$14,550
	LZR 2630	16.1 x 26.7 x 23.4	Toshiba A740	26	100,000	32K	300 x 300	Diablo 630	NP	5/No	*	No	500	No	Labels	55	Legal firm support	\$15,600
	LZR 2655	16.1 x 26.7 x 23.4	Toshiba A740	26	80,000	3	300 x 300	NP	Riprint	3/Yes	*	No	500	No	Labels	55	Interleaf software support	\$20,800
	LZR 2655 LJ	16.1 x 26.7 x 23.4	Toshiba A740	26	100,000	3	300 x 300	HP Laserjet 2000	NP	34/Yes	32	Yes	1,500	NP	Labels	55	Network support	\$14,995

* — Limited by memory only

The companies included in this chart responded to a recent telephone survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

PRINTERS & PLOTTERS

PRODUCT SPOTLIGHT

COMPANY	PRODUCT	DIMENSIONS (INCHES)	ENGINE	PRINT SPEED (PAGE PER MINUTE)	DUTY CYCLE (PAGE PER MONTH)	AMOUNT ON-BOARD MEMORY (MEGABYTES)	RESOLUTION (DOT PER INCH)	EMULATIONS	PAGE DESCRIPTION LANGUAGES SUPPORTED	NUMBER OF HARDWARE FONTS/OFFERS SUPPORT FOR SOFTWARE FONTS	NUMBER OF FONTS PER PAGE	RESIDENT MACROS FOR FORMS	MAXIMUM INPUT SHEET CAPACITY	COLLATING	ENVELOPES/LABELS	NOISE LEVEL (db)	MOST TYPICAL USE	PRICE
Dataproducts Corp. (818) 887-8000	LZR 1230	12.6 x 18.9 x 19.4	Toshiba A739	12	25,000	512K	300 x 300	Diablo 630, Epson FX-80, HP Laserjet Plus	NP	6/Yes	16	Yes	250	Yes	Both	55	Office automation	\$3,990
Data Systems Hardware (703) 742-8266	VX020	12.5 x 19 x 20	Proprietary	12	25,000	4	300 x 300	HP Laserjet II	Postscript	35/Yes	*	Yes	750	Yes	Both	55	Office automation	\$7,995
	VX023	24 x 27 x 23	Olympus	30	250,000	6.5	300 x 300	DEC LN03, 2400; HP Laserjet; IBM 3777, 3780, 5256, 3268	Postscript	43/Yes	*	Yes	2,500	Yes	Labels	55	Network print server	\$23,640
	VX024	24 x 27 x 23	Olympus	45	250,000	6.5	300 x 300	DEC LN03, 2400; HP Laserjet; IBM 3777, 3780, 5256, 3268	Postscript	43/Yes	*	NP	2,500	Yes	Labels	55	Print server	\$29,995
Digital Equipment Corp. (508) 483-5111	PrinterServer 40	40.4 x 60 x 28.4	Ricoh	40	100,000	5	300 x 300	DEC LN03	Postscript	29/Yes	*	No	250	Yes	Labels	57	Departmental printing	\$50,650
Electronic Forms Systems (214) 250-7000	Formwriter 10XD Page-Printing System	38 x 58.6 x 24	Canon LBP-20	16-20	30,000	None	300 x 300	Epson RX, proprietary	Proprietary	30/No	36	No	2,000	Yes	Labels	57	Form processing	\$26,595
Fujitsu America, Inc. (408) 432-1300	RX7200 Desktop Laser Printer	13.5 x 16.9 x 21.6	Fujitsu M3723M	12	10,000	640K	300 x 300	HP Laserjet Plus, Diablo 630, Epson FX-80, IBM Proprietary	NP	7/No	*	No	500	Yes	Both	50	General office	\$3,995
	RX7300E Desktop Laser Printer	12.3 x 19.1 x 20.1	Fujitsu M3722N	18	50,000	2.5	300 x 300	Epson FX-80, Diablo 630, Qume Sprint II, IBM Proprietary, Fujitsu M304X	NP	7/No	*	Yes	250	Yes	Labels	52	Shared printing	\$9,350
	RX7400 Desktop Laser Printer	12.2 x 19.1 x 22	Fujitsu M3743	22	50,000	2.5	300 x 300	Diablo 630, Qume Sprint II, Epson FX-80, IBM Proprietary, HP Laserjet Plus, Fujitsu M304	NP	7/Yes	*	Yes	250	Yes	Labels	52	Shared printing	\$12,500
Harris Corp., Computer Systems Division (305) 974-1700	PL 2655-A1	16.1 x 26.7 x 23.4	Toshiba	26	80,000	3	300 x 300	Diablo 630, Tektronix 4010, 4014, Riprint	NP	13/Yes	13	No	750	No	Labels	55	Word processing	NP
Hewlett-Packard Co. (800) 752-0900	Laserjet 2000 Model II	48.8 x 56.5 x 25	Canon LBP-20	22	70,000	1.5-5.5	300 x 300	HP Laserjet, Laserjet Plus, 500+, SIL, IID	None	34/Yes	*	Yes	2,500	Yes	No	59	Word processing	\$25,675
	Laserjet 2000 Model P	48.8 x 56.5 x 25	Canon LBP-20	20	70,000	1.5-5.5	300 x 300	HP Laserjet, Laserjet Plus, 500+, SIL, IID	None	34/Yes	*	Yes	2,500	Yes	No	57	Word processing	\$21,995
	Laserjet 2000 Model A	48.8 x 53.4 x 25	Canon LBP-20	20	70,000	1.5-5.5	300 x 300	HP Laserjet, Laserjet Plus, 500+, SIL, IID	None	34/Yes	*	Yes	500	Yes	No	57	Word processing	\$19,995
IBM (800) 426-3333	IBM 3825	43 x 29.5 x 58.3	Proprietary	58	1,000,000	2-16	240 x 240	None	Intelligent Printer Data Stream (IPDS)	None/Yes	63	No	3,100	Yes	Labels	59	Corporate publishing	\$135,000
	IBM 3835	55.6 x 80.1 x 33.1	Proprietary	88	1,800,000	2-16	240 x 240	None	IPDS	NA/Yes	63	No	4,000	Yes	Labels	59	Intermediate-speed leaflet printer	\$148,500
	IBM 3800-3	60 x 145 x 32	Proprietary	215	4,500,000	2-16	240 x 240	IBM 3800-1	IPDS	NA/Yes	64	No	4,000	Yes	No	64	High-speed production printing	\$283,500
	IBM 3800-6	60 x 145 x 32	Proprietary	134	2,800,000	8	240 x 240	IBM 3800-1	IPDS	NA/Yes	64	No	4,000	Yes	No	64	High-speed production printing	\$220,500
	IBM 3820	11 sq. ft.	Proprietary	20	100,000	NP	240 x 240	None	IPDS	NA/Yes	32	No	1,350	Yes	Labels	59	High-quality distributed printing	\$34,310
Idea Courier (800) 528-1400	9375	17.5 x 21.5 x 28.5	Ricoh	15	25,000	256K	300 x 300	Diablo 630, HP Laserjet Plus, TI 855, Qume Sprint II, Epson MX, IBM Proprietary	None	*/Yes	*	No	250	Yes	Labels	55	Shared resource printer	\$5,995
Interface Systems, Inc. (800) 544-4072	ISI 7812	13.8 x 16.9 x 22.8	Fujitsu RX7200	12	10,000	3	300 x 300	IBM 3812 Page-printer, HP Laserjet Plus	IPDS	62/Yes	*	Yes	500	No	Both	50	Office automation	\$8,750
Interleaf, Inc. (617) 577-9800	LPR-388	24.5/43 x 60 x 28/23	Canon	20	30,000	4	300 x 300	Line printer	Riprint	18/Yes	*	NP	2,000	No	Labels	NP	Demand proofing	\$22,595-\$39,500
Kyocera Union (415) 748-6680	F1000 A	12.6 x 16.9 x 17.7	Proprietary	10	10,000	512K-1.5M	300 x 300	HP Series II, Epson FX-80, IBM Graphics, NEC Spinwriter, Qume Sprint II, Diablo 630	Prescribe	79/Yes	46	Yes	250	No	Both	NP	Word processing	NP
	F2010	14.3 x 18.5 x 18.3	Proprietary	10	10,000	1.5	300 x 300	HP Series II, Epson FX-80, IBM Graphics, NEC Spinwriter, Qume Sprint II, Diablo 630	Prescribe	79/Yes	46	Yes	500	Optional	Both	NP	Word processing	NP
	F-3010	14.3 x 18.5 x 18.3	Proprietary	18	20,000	1.5-3	300 x 300	HP Series II, Epson FX-80, IBM Graphics, NEC Spinwriter, Qume Sprint II, Diablo 630	Prescribe	79/Yes	46	Yes	500	Optional	Both	NP	Word processing	NP
Lexi Computer Systems (508) 681-1118	1019 Model II	12.6 x 16.9 x 17.7	Kyocera 1000A	10	10,000	1	300 x 300	IBM 5319, Diablo 630, HP Laserjet II	Prescribe	79/Yes	128	Yes	1,000	No	Optional	55	Word/data processing	NP
	1087 Model II	12.6 x 16.9 x 17.7	Kyocera 1000A	10	10,000	1	300 x 300	IBM 4214, 3287; Diablo 630; HP Laserjet II	Prescribe	79/Yes	128	Yes	1,000	No	Optional	55	Word/data processing	NP

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PRINTERS & PLOTTERS

PRODUCT SPOTLIGHT

COMPANY	PRODUCT	DIMENSIONS (INCHES)	ENGINE	PRINT SPEED (PAGE PER MINUTE)	DUTY CYCLE (PAGE PER MONTH)	AMOUNT ON-BOARD MEMORY (MEGABYTES)	RESOLUTION (DOT PER INCH)	EMULATIONS	PAGE DESCRIPTION LANGUAGES SUPPORTED	NUMBER OF HARDWARE FONTS/OFFERS SUPPORT FOR SOFTWARE FONTS	NUMBER OF FONTS PER PAGE	RESIDENT MACROS FOR FORMS	MAXIMUM INPUT SHEET CAPACITY	COLLATING	ENVELOPES/LABELS	NOISE LEVEL (db)	MOST TYPICAL USE	PRICE
Leadi Computer Systems (508) 681-1118	2019	13.6 x 17.3 x 17.5	Kyocera 2010	10	20,000	1.5	300 x 300	IBM 4214, 3812, 5219, 5224, 5225; HP Laserjet	Prescribe	79/Yes	128	Yes	1,000	Yes	Optional	55	Word/data processing	NP
	2087	13.6 x 17.3 x 17.5	Kyocera 2010	10	10,000	1.5	300 x 300	HP Laserjet; IBM 3287, 4214, 3268	Prescribe	79/Yes	128	Yes	1,000	Yes	Optional	55	Word/data processing	NP
	3019	13.5 x 17.3 x 17.5	Kyocera F-3010	18	20,000	1.5	300 x 300	HP Laserjet; IBM 3812, 5219, 5224	Prescribe	79/Yes	128	Yes	1,000	Yes	Optional	55	Word/data processing	NP
	3087	13.6 x 17.3 x 17.5	Kyocera 18	20,000	1.5	300 x 300	HP Laserjet; IBM 3287, 4214, 3268	Prescribe	79/Yes	128	Yes	1,000	Yes	Yes	Optional	55	Word/data processing	NP
Mannesmann Tally (306) 251-5500	MT Universal Publishing System	14.4 x 36 x 18.3	Kyocera	10	5,000-10,000	2	300 x 300	HP Laserjet	Postscript, DDL	52/Yes	*	No	500	Yes	Both	55	Desktop publishing	\$5,495
	MT 910	14.4 x 36 x 18.3	Kyocera	10	5,000-10,000	512K	300 x 300	IBM Proprinter, HP Laserjet Plus, Diablo 630, Epson FX, Quine Sprint II	NP	18/Yes	16	No	500	Yes	Both	55	Desktop publishing	\$3,695
Memorex Telex (800) 950-3465	1815	17.5 x 21.5 x 28.5	Ricoh LP4150	15	25,000	512K	300 x 300	IBM 3287, 5219, Proprinter; Diablo 630; HP Laserjet; TI 810, 855	NP	3/Yes	*	NP	500	Yes	Labels	55	3270 system printer	\$8,995
	2115B	17.5 x 21.5 x 28.5	Ricoh LP4150	15	25,000	768K	NP	IBM Proprinter; Diablo 630; HP Laserjet Plus; Epson FX-80	Proprietary	35/Yes	*	NP	500	Yes	Labels	55	LAN printer	\$7,495
	2115 BP 04	17.5 x 21.5 x 28.5	Ricoh LP4150	15	25,000	1.2	NP	IBM Proprinter; Diablo 630; HP Laserjet Plus; Epson FX-80	Proprietary	35/Yes	*	NP	500	Yes	Labels	55	LAN printer	\$7,995
Minolta Corp. (800) 237-8087	SP 130	17 x 17.4 x 19.4	Proprietary	12	5,000	1.5	300 x 300	Epson FX-80, HP Laserjet Plus, Diablo 630	None	1/Yes	*	No	250	Yes	Both	55	Word processing	\$3,895
Motorola, Inc. Computer Systems Division (408) 255-0900	PT4100	12.6 x 18.9 x 19.4	Dataproducts 1230	12	25,000	512K-2M	300 x 300	Epson FX-80, HP Laserjet Plus, Diablo 630	Postscript, DDL	6/Yes	16	Yes	750	No	Both	45	Word processing	\$3,695
NBS Southern, Inc. (813) 541-2200	3840D	39.9 x 43.3 x 23.6	Hitachi	40	200,000	6	300 x 300	IBM 3203/5, 5219, 5225	Proprietary	57/Yes	*	Yes	1,750	Yes	Labels	60	Data processing	\$39,950-\$54,950
NCR Corp. (316) 636-8570	NCR 6436-0201 Printer	18 x 22 x 26	Ricoh LP4150	15	25,000	1.5-2	300 x 300	IBM Proprinter; Diablo 630; HP Laserjet Plus; Epson FX-80	NP	14/Yes	*	Yes	500	NP	Labels	55	General-purpose	\$6,245
	NCR 6436-0501 Printer	18 x 22 x 26	Ricoh LP4150	15	25,000	3-4	300 x 300	HP Laserjet II, HPGL, IBM Proprinter XL, Epson FX, Diablo 630, line printer	PDL, Postscript	35/Yes	*	Yes	500	NP	Labels	55	Desktop publishing	NP
Nisei Sangyo America Ltd. (617) 893-5700	LB40 Duplex Laser Printer	39 x 29 x 26	Hitachi	40	200,000	4	240 x 240 or 300 x 300	IBM 5219, line printer	Proprietary	15/Yes	*	Yes	500	Yes	Both	60	Demand publishing	\$40,000-\$55,000
Office Automation Systems, Inc. (619) 452-9400	Laserpro 2200	28.8 x 25.6 x 19	Minolta	22	66,000	1.5	300 x 300	HP Laserjet Plus, Diablo 630, Epson FX-80, NEC, Quine, IBM Proprinter	Express	25/Yes	*	No	250	Yes	Both	55	Shop floor label printing	\$15,500
	Laserpro 1510	16.5 x 26 x 21.5	Ricoh LP4150	15	25,000	768K	300 x 300	HP Laserjet Plus, Diablo 630, Epson FX-80, NEC, Quine, IBM Proprinter	Express	27/Yes	*	No	500	Yes	Labels	55	Shop floor label printing	\$6,495
	Laserpro 5215	16.5 x 26 x 21.5	Ricoh LP4150	15	25,000	768K	300 x 300	IBM 5256, 4210, 5225, Proprinter, 5224, 4214, 5219, 3812; HP Laserjet Plus; NEC, Quine; Epson FX-80; Diablo 630	Express	34/Yes	*	No	500	Yes	Labels	55	IBM System/3X printer	\$7,400
Olivetti USA (201) 526-8200	PG 1230	12.6 x 18.9 x 19.4	Toshiba A739	12	25,000	512K	300 x 300	HP Laserjet Plus, Epson FX-80, Diablo 630	NP	5 resident, 20 with cards/Yes	16	Yes	750	Yes	Both	55	Word processing	\$4,195
	PG 1260	12.6 x 18.9 x 19.3	Toshiba A739	12	25,000	4	300 x 300	HP Laserjet Plus	Postscript	35/Yes	*	Yes	750	Yes	Both	55	Desktop publishing	\$9,195
	PG 2630	16.1 x 26.7 x 23.4	Toshiba A740	26	80,000	512K	300 x 300	Diablo 630	None	104/Yes	64	No	750	NP	Both	55	Word processing	\$18,100
Panasonic Communications Systems Co. (800) 742-8086	Panasonic Laser Printer KX-P4450	14.5 x 28 x 17	Panasonic KX-P4450	11	5,000	512K	300 x 300	IBM Proprinter	None	11/Yes	*	Yes	500	Yes	Both	55	Text processing	\$2,595
Pentax Technologies Corp. (303) 460-1600	Laserfold 240	7.22 x 17.94 x 20.4	Proprietary	16	20,000+	32K	240 x 240	Epson FX-80 (text only)	None	1/No	1	No	NA	NA	Both	53	Continuous-form printing	\$2,995
Personal Computer Products, Inc. (619) 485-6411	Laserimage 3000	16 x 21.5 x 18.5	Ricoh LP4150	15	25,000	1.5	300 x 300	HP Laserjet Plus, IBM Proprinter, Epson FX-80, Diablo 630, HPGL	NP	31/Yes	*	No	500	Yes	Labels	NP	Office automation	\$6,395
Printonix (714) 863-1900	L1012	12.5 x 18.9 x 17.3	Mita	12	25,000	512K	300 x 300	HP Laserjet Plus, Epson FX-80, Diablo 630	None	18/No	18	No	500	Yes	Labels	55	Multituser printing	\$3,495

PRINTERS & PLOTTERS

PRODUCT SPOTLIGHT

COMPANY	PRODUCT	DIMENSIONS (INCHES)	ENGINE	PRINT SPEED (PAGE PER MINUTE)	DUTY CYCLE (PAGE PER MONTH)	AMOUNT ON-BOARD MEMORY (MEGABYTES)	RESOLUTION (DOT PER INCH)	EMULATIONS	PAGE DESCRIPTION LANGUAGES SUPPORTED	NUMBER OF HARDWARE FONTS/OFFERS SUPPORT FOR SOFTWARE FONTS	NUMBER OF FONTS PER PAGE	RESIDENT MACROS FOR FORMS	MAXIMUM INPUT SHEET CAPACITY	COLLATING	ENVELOPES/LABELS	NOISE LEVEL (db)	MOST TYPICAL USE	PRICE
QMS, Inc. (205) 633-4300	PS-2200	20 x 20.5 x 18	Panasonic FPL-301	22	20,000	4	300 x 300	HP Laserjet Plus, 7475	Postscript	35/Yes	*	No	600	No	Labels	55	Shared desktop publishing	\$15,995
	PS-1500	18.7 x 18.1 x 19.3	Ricoh LP4150	15	15,000	4	300 x 300	None	Postscript	35/Yes	*	No	500	Yes	Labels	55	Shared desktop publishing	\$7,995
	Lasergrafix 1510	18.7 x 18.1 x 19.5	Ricoh LP4150	15	15,000	6	300 x 300	Quine Sprint II, Diablo 630, ASCII line printer, Tektronix 4010/4014	QUIC	16/Yes	*	Yes	500	Yes	Labels	55	CAD/CAM	\$11,995
	Lasergrafix 2200	20 x 20.5 x 18	Panasonic FPL-301	22	20,000	7	300 x 300	Quine Sprint II, Diablo 630, ASCII line printer, HP 747A, Tektronix 4010/4014	QUIC	36/Yes	*	Yes	600	No	Labels	55	CAD/CAM	\$15,995
	Turbo Imageserver XP		Canon LBP-20	20	35,000	6-20	300 x 300	Epson FX; Diablo ECS; Ultrascrypt; IBM 5152, 1403; Tektronix 4010/4014	Impress	35/Yes	*	NP	2,500	Yes	Labels	67	NP	\$26,450
	6320, 7320 Turbo Imageserver XP	55.1 x 63.8 x 23.6; 45.3 x 57.7 x 23.6	Canon LBP-20	20	35,000	6-20	300 x 300	IBM 5152, 1403; Epson FX; Diablo ECS; Tektronix 4010/4014	Impress	35/Yes	*	NP	2,500	Yes	NP	61	NP	\$36,450; \$39,450
	3320, 5320 Turbo Imageserver XP	20.1 x 57.7 x 23.6; 62.8 x 23.6 x 55.1	Canon LBP-20	20	35,000	6-20	300 x 300	Epson FX; Diablo ECS; Ultrascrypt; IBM 5152, 1403; Tektronix 4010/4014	Impress	35/Yes	NP	NP	500, 2,500	Yes	Labels	57	NP	\$26,450
Qume Corp. (800) 223-2479	Scripter Laser Printer	20 x 17.25 x 15	Hitachi	10	5,000	1-3	300 x 300	HP Laserjet Plus	Postscript	35/Yes	*	No	250	No	Labels	50	Desktop publishing	\$4,595
	Ricoh Corp. (408) 432-8800	PC Laser 15/EX	Proprietary	15	25,000	NA	300 x 300	NA	NA	NA	NA	NA	500	No	Labels	55	Business applications (controller not included)	\$4,995
	Siemens Information Systems, Inc. (Peripheral Systems Division) (714) 991-9700	2300	Siemens 2300-2/3	206	3 million	10K	240 x 240	IBM 3800-3/6	None	64/Yes	64	Yes	4,000	Yes	Labels	70	Data processing	\$265,000
Storage Technology Corp. (303) 673-4063	2200	58 x 76 x 37	Siemens 2200-2/3	103	1.2 million	10	240 x 240	IBM 3800-3/6	None	64/Yes	64	Yes	4,000	Yes	Both	65	Data processing	\$165,000
	2050	62 x 71 x 22.5	Siemens 2050	50	600,000	24	240 x 240	IBM 3211	None	4/Yes	4	Yes	3,000	Yes	Labels	60	Data processing	\$79,000
	STK 6100 Laser Printer Subsystem	57.8 x 77.6 x 37	Siemens 2200	103	1.5 million	5	240 x 240	IBM 3800-3	Advanced Function Printing	20/Yes	NP	Yes	3,300 (in-fold)	No	Labels	61	High-volume production	\$175,000
Talaris Systems, Inc. (619) 587-0787	1590 Printstation	16.33 x 21.25 x 18.5	Ricoh LP4150	15	15,000	3	300 x 300	DEC LNO3 Plus, HP Laserjet II, Tektronix 4014, Diablo 630	Postscript interpreter	43/Yes	*	Opt.	500	Yes	Labels	55	NP	\$8,490
	2492-B Printstation	41 x 36 x 28	Xerox XP24	24	60,000	5.5	300 x 300	DEC LNO3 Plus, HP Laserjet II, Tektronix 4014, HPGL, Diablo 630	Postscript interpreter	43/Yes	*	Opt.	2,000	Yes	Labels	55	Demand graphics printing	\$24,490
Texas Instruments, Inc. (800) 527-3566	OmniLaser 2015	17.5 x 21.5 x 28.5	Ricoh LP4150	15	25,000	512K	300 x 300	HP Laserjet, Diablo 630, TI 855	None	1/No	6	No	500	No	Labels	55	Word processing	\$5,995
	OmniLaser 2115	17.5 x 21.5 x 28.5	Ricoh LP4150	15	25,000	3	300 x 300	HP Laserjet Plus, TI 855, HP/475 Plotter	Postscript	13/Yes	*	No	500	No	Labels	55	Shared desktop publishing	\$7,995
TMC Company (215) 964-8862	Laser Printer	17.5 x 28.5 x 17.5	Ricoh LP4150	15	25,000	512K	300 x 300	HP Laserjet, Diablo 630	Postscript	5/Yes	NP	NP	500	No	Both	NP	Shared printing	\$5,995; \$7,995
	Laser Printer	12.4 x 28.1 x 21.1	Konica LP-3010	10	10,000	512K	300 x 300	HP Laserjet Series II	NP	6/Yes	NP	NP	250	No	Both	NP	Workstation printing	\$3,295
Toshiba America Information Systems, Inc. (800) 457-7777	Page Laser 12	12.6 x 19 x 19.5	Proprietary	12	25,000	512K	300 x 300	HP Laserjet Plus, Diablo 630, Toshiba P351, Quine Sprint II, IBM Proprinter	Postscript	3/Yes	64	No	250	Yes	Labels (envelopes optional)	55	High-volume printing	\$3,799
Unisys Corp. (408) 434-2878	AP 9215-1	NP	Ricoh	15	25,000	2	300 x 300	IBM Proprinter, HP Laserjet, Diablo 630, Epson (option)	CGI graphics	16/Yes	Software dependent	Opt.	500	Yes	Labels	55	Departmental computing	\$6,295

PRINTERS & PLOTTERS

PRODUCT SPOTLIGHT

COMPANY	PRODUCT	DIMENSIONS (INCHES)	ENGINE	PRINT SPEED (PAGE PER MINUTE)	DUTY CYCLE (PAGE PER MONTH)	AMOUNT ON-BOARD MEMORY (MEGABYTES)	RESOLUTION (DOT PER INCH)	EMULATIONS	PAGE DESCRIPTION LANGUAGES SUPPORTED	NUMBER OF HARDWARE FONTS / OFFERS SUPPORT FOR SOFTWARE FONTS	NUMBER OF FONTS PER PAGE	RESIDENT MACROS FOR FORMS	MAXIMUM INPUT SHEET CAPACITY	COLLATING	ENVELOPES / LABELS	NOISE LEVEL (db)	MOST TYPICAL USE	PRICE
Unisys Corp. (408) 434-2878	AP 9230	NP	Minolta	30	40,000	2	300 x 300	Diablo 630, HP Laserjet Plus, IBM Proprinter, Epson	Express	31/Yes	Software dependent	NP	500	Yes	Labels	55	Departmental computing	\$19,500
	AP 9415	NP	Ricoh	15	25,000	3	300 x 300	Diablo 630, HP Laserjet	Postscript	35/Yes	Software dependent	Yes	500	Yes	Labels	55	Desktop publishing	\$8,995
Verityper, Inc. (201) 887-8000	VT600	18.5 x 23 x 21.1	Proprietary	7-10	3,000	6-12	600 x 600	Postscript	Postscript	35/Yes	NP	NP	200	No	Labels	60	Publishing	\$16,995-\$22,995
	XP-1000	37.5 x 29.5 x 27	Proprietary	20	50,000	NP	1,016 x 508	Proprietary	Postscript, Core 202, Slave	NP	NP	NP	250	No	NP	NP	Publishing	NP
Wang Laboratories, Inc. (508) 459-5000	LCS15	16.6 x 21.3 x 18.5	Ricoh LFM2	15	25,000	3	300 x 300	Diablo 630	Postscript	32/Yes	*	No	500	Yes	No	55	Text, image and graphics printing	\$8,000-\$11,500
	LIS-24	36 x 43.2 x 26	Xerox XP-24	24	40,000	2.5	300 x 300	None	Proprietary	None/Yes	*	No	2,000	Yes	No	57	Text, image and graphics printing	\$26,000
Xerox Corp. (213) 333-2151	3700	46.5 x 39.9 x 27.5	Proprietary	24	30,000-60,000	10-50	300 x 300	NP	Interpress	2/Yes	16	Yes	2,000	No	Labels	NP	Report generation	\$29,995
	2700 II	36 x 26 x 26	Proprietary	12	15,000	256K	300 x 300	NP	Interpress	2/Yes	16	NP	500	No	No	NP	Desktop publishing	\$14,495
	4045 Laser CP Models 150/120	10.5 x 27.5 x 21.5	Proprietary	10	5,000-20,000	1-2	300 x 300	Diablo 630, HP Laserjet Plus, IBM 3287, 5224, 5225	Interpress	2/Yes	128	Yes	750	No	Both	NP	Word processing	\$4,995-\$6,495
	4050	NP	Proprietary	50	100,000-850,000	512K	300 x 300	IBM 3211/3811	Interpress	NP/Yes	96	NP	1,500	Yes	Labels	NP	Desktop publishing	\$140,500
	4650	41 x 59 x 34.5	Proprietary	50	100,000-850,000	512K	600 x 600	IBM 3211	Interpress	225/Yes	128	Yes	1,500	Yes	Labels	NP	Corporate publishing	From \$171,000
	8790	NP	Proprietary	75	300,000-1 million	128K	300 x 300	NP	Interpress	NP/Yes	96	NP	3,000	Yes	Labels	NP	Publications	\$208,035
	4090	NP	Proprietary	92	500,000	1	300 x 300	IBM 3211	Interpress	225/Yes	128	Yes	1,500	Yes	Labels	NP	High-quality forms	From \$190,000
	9790	NP	Proprietary	120	500,000-3 million	128K	300 x 300	NP	Interpress	NP/Yes	96	NP	3,000	Yes	Both	NP	Publications	\$416,035
	XP 1800	19.1 x 20.1 x 12.2	Fujitsu RX7300	18	50,000	1-2	300 x 300	IBM 5219, 3812	NP	NP/Yes	16	Yes	1,250	Yes	Labels	55	Electronic forms generation	\$11,900
	XP 1100	14.5 x 28 x 17	Panasonic KCP 4450	11	5,000	512K-1.5M	300 x 300	IBM 5219, 3812	NP	10/NP	16	Yes	500	NP	Both	55	Electronic forms generation	\$4,495
Xpoint Corp. (404) 446-2764	XP 6219/12	18.9 x 19.4 x 12.6	Toshiba Page Laser/2	12	10,000	512K-2M	300 x 300	IBM 5219, 3812	NP	10/Yes	16	Yes	500	Yes	Both	55	Electronic forms generation	\$5,950

Plotters

FROM PAGE 54

so many possibilities. Some plotters can be connected to networks and shared by a number of users, usually with a separate interface device that performs plot queuing and buffering functions.

This introduces certain administrative complexities. For instance, who controls the plot queue? Who changes the pens and cleans them? Who changes the paper? But these problems can be overcome, enabling users to justify the purchase of expensive, high-speed plotters.

Standard ways to communicate with plotters have come from the most successful plotter vendors. The most popular interface protocol is HPGL, a graphics language developed by Hewlett-Packard that is supported by all the leading graphics application programs.

Pen plotters offer sharp lines, color and a variety of media at low cost. But compared with electrostatic plotters or laser printers, they are slow, especial-

ly for operations such as hatching or filling. Also, unlike lasers, pen plotters cannot produce graded shades and must be monitored during their operation.

Best buy

Pen plotters are currently the most inexpensive large-format color output devices available for CADD. But they face a challenge in this area from color thermal transfer printers, which are decreasing in price and increasing in format size.

For desktop graphics applications, pen plotters are still an alternative; units are available for as little as \$1,200, compared with \$4,000 for a 300 dot/in. color thermal transfer page printer. However, innovations from the ink-jet market pose a serious threat to desktop plotters.

The plotter faces an uncertain future, threatened by the emergence of faster, more reliable and less expensive output technologies. But due to the loyalty of a small cadre of users, the final chapter on plotters will not be written for at least another decade — if then. •

Creativity

FROM PAGE 55

graphics much beyond forms.

"I don't see people using high-speed printers for sophisticated output except for forms," says Angele Boyd, manager of printer research at International Data Corp. in Framingham, Mass. Vendors are not convinced of that, however, and they are expending considerable effort developing printers with higher resolution, better graphics software control and processing and color.

Xerox is leading the trend toward increased resolution with an expected 600 dot/in. model this year, and other manufacturers are following suit. Typically, high-volume printers offer 240 to 300 dot/in.

IBM is pushing its Advanced Function Software (AFP) printer control language, and other vendors are preparing machines compatible with AFP. Other developments, such as IBM's Intelligent Printer Data Stream, will push graphics processing down

to the printer from mainframes.

Color is one advance that many users are anxiously awaiting. "We're very interested in color," says Cliff Dodd, vice-president of billing and payment service at American Express. Dodd, whose objective is to make the charge statement as understandable and pleasing to the eye as possible, sees color as a desirable tool for that purpose.

Alternatives popping up

Although laser technology is on the rise in the high-volume market, newer technologies are popping up with promises of equal quality and higher reliability at lower cost. Right now, LED, ion deposition and magnetography are the major alternatives.

LED is an electrophotographic technology similar to laser printing. Unlike laser printing, LED machines are not based on copier technology, a primary source of the laser's reliability problems, IDC's Boyd says.

Ion deposition printing, developed by Delphax Systems, Inc., uses pressure to transfer the image to the paper. Although

less costly and less fragile than lasers, ion deposition has one major drawback, Boyd says — the transfer technique gives documents an unpleasant sheen.

Magnetography, developed by Bull Peripherals Corp., uses thousands of electromagnetic heads on the print drum to reproduce an image. Although a strong contender on the basis of cost and capability, magnetography has been slow to catch on. "It is practically nonexistent in this market," Boyd says. (See story page 55 about one organization that has decided to take a chance on magnetography.)

In fact, all the alternatives are still too new and unproven to attract more than passing interest from the majority of high-volume printer users. Because of the difficulty in getting high-volume printers to interface with existing systems and the investment in software development to make the graphics work, users are extremely loyal to their existing technology. At least for the next few seasons, lasers will be the vehicle of choice for high-volume users. •

IN DEPTH

An old idea gets a new twist

High-end graphics plus supercomputer power boost interactive technology

BY DAVE EVANS

It's amusing to recall that in the early days of computer behemoths, thinking people estimated that the total number of computing machines the world would ever need was about six. Clearly this projection did not hold up very well. Most estimates of the number of computers in use today run at somewhere around 80 million.

Certain ideas from these formative years have stood the test of time, however. The concept of interactive computing — the ability of humans to guide and participate in the computer-based problem-solving process — was the vision of the earliest architects of computer science. Even Charles Babbage provided a rudimentary form of interactivity in his earliest design by allowing for an alarm to ring at various intervals, signifying an opportunity for human input.

But despite the early recognition of the need for humans to monitor and interact with their computer tools during the course of problem solving, technical barriers prevented the realization of this vision. Even today, the world's most powerful supercomputers do not allow true human-machine interaction because of their "batch" orientation; they are incapable of accepting input until after the computation has been completed.

Evans is co-founder and chairman of Evans and Sutherland Computer Corp., a designer and builder of advanced graphics, modeling and simulation products based in Salt Lake City.

While so-called "superworkstations" are touted as interactive machines, they do not have nearly enough computational horsepower to deal with the kinds of complex problems facing today's scientists and engineers. Thus, existing computing platforms have been rendered cumbersome, if invaluable, allies in the scientific and technical problem-solving process.

Recently, however, advancements in two areas — computer graphics and supercomputing technology — have challenged the barriers to truly interactive computing. Powered by newly available computational resources, the new class of supercomputers holds a promise similar to that of such problem-solving tools as the scanning

electron microscope or the telescope at their inception.

Consider the following example, which helps illustrate the significance of this technology convergence: Imagine a major U.S. car manufacturer putting a sports car prototype through its paces. A torrential rain offers the perfect conditions under which to test the braking capabilities of this high-performance vehicle. The car careens around a curve, and the brakes are slammed to the floorboards. But the wet brakes do not respond as quickly as had been expected. The car goes into a dangerous skid, hits a retaining wall, and tumbles end over end.

Miraculously, however, the car remains intact, and another prototype, with a modified brake

system, is instantly readied to try the course again. The reason? The test drive has been conducted on an interactive supercomputer. In fact, there is no car, no driver and no test course; only a powerful supercomputer, a sophisticated graphics system and a mechanical engineer with the heart of a race car driver. This is not simple computer-generated animation such as that seen on television commercials. This scenario portends actual processing providing more realistic results.

Breaking reality barriers

Interactive computing represents the synthesis of a diverse body of work in computer science. It relies on developments in graphics and supercomputing



JEFF FARIA

- Megabandwidth connectivity required
- Moderate parallelism the way to go
- Simulating an experimental world

and also on the blending of these two disciplines: graphics, to provide the vital link between the human and the computer, and supercomputing technology, to power this compute-intensive interaction.

In many ways, the advantages of this synthesis are far greater than the individual benefits of either of its key elements. Take another example, this time from the field of molecular modeling: A scientist trying to determine the configuration of a genetically altered molecule can use a sophisticated graphics package to produce three-dimensional drawings of the possible configurations. But to test the accuracy of these configurations, he needs far

rotate the molecule on all axes, apply varying forces and test each molecule's integrity under conditions that would be impractical to simulate in any other way. With enough power, he can add the dimensions of time and space to his computer images, performing experiments currently impossible in the laboratory.

This is perhaps the most compelling benefit of this new breed of interactive computers: They may allow scientists and engineers to break the traditional barriers of reality and simulate an experimental world entirely under their control.

Ironically, as much as this new breed of computing depends on visualization, it is

This is where existing supercomputers fall short: Because the designers of the original supercomputers did not foresee the ultimate need for converging graphics and compute power, they did not build their machines with interactivity and visualization in mind. Instead they chose an architecture, based on vector processing, designed to speed computation in highly specialized, batch-oriented number-crunching applications. Unfortunately, this architecture is incompatible with the effective execution of graphics.

Furthermore, computers based on vector architectures function efficiently only in a narrow range of extremely compute-intensive, noninteractive applications. Even in these applications, painstaking modifications in code — using a process called vectorization — are required if users are to achieve anything close to peak performance. These limitations have served to keep supercomputer performance in the hands of a few elite, high-performance users.

Rise of moderate parallelism

Recently, however, a new type of supercomputer architecture known as moderate parallelism — based on a moderate number (two to eight) of processors functioning in parallel — is being developed by some high-end supercomputer vendors and research laboratories. Moderate parallelism will help to overcome the problems associated with traditional vector-based or massively parallel supercomputers. Not only will this architecture broaden the range of potential supercomputer applications, but it will accommodate both visualization and interactivity. Moderate parallelism has the potential to allow users to achieve the supercomputer performance required for interactive, visually oriented applications without the need for major alterations in code.

Once these new computer architectures take hold — which may occur in the next two years — the only barrier to truly interactive supercomputing will be connectivity. Because generating graphics is so compute-intensive, a great deal of bandwidth is required to transmit graphics data between the user's workstation — where graphics are displayed and manipulated — and the supercomputer, where the actual calculations are performed.

One current solution to this problem is to provide substantial graphics processing power at the workstation level; thus, data can be "preprocessed" so that only essential information is sent over the limited data pipeline.

The long-term solution, however, involves the development of connectivity technologies more appropriate for interactive supercomputing. Such efforts are currently under way at Sandia National Laboratories in Albuquerque, N.M., Apple Computer, Inc. in Cupertino, Calif., and the National Center for Supercomputing Applications at the University of Illinois at Urbana-Champaign, among others. These megabandwidth technologies will be economically feasible for the larger scientific, technical and commercial market in the next five years.

In the natural sciences, advanced interactive computers will offer researchers increased flexibility and freedom, par-

ticularly in fields such as meteorology or cosmology for which there is no laboratory. In these disciplines, scientists have been at the mercy of the atmosphere or the cosmos in conducting their experiments, with no control over the timing or the conditions of their research.

Through interactive computing, however, scientists can potentially simulate many experimental conditions, change variables and watch the results on their computer screens. Scientists will be able to witness the formation of phenomena from weather systems to galaxies on their computers. They will also be able to verify theories that were previously untestable, such as those concerning the birth of the universe or the death of stars.

In addition to freeing researchers from the typical constraints of laboratory conditions, interactive computers will release them — through the power of visualization — from the constraints on their own creativity. Scientists have long understood that the human mind solves problems by creating and manipulating images, visualizing the problem and imagining possible solutions.

By scanning a single image, the human mind can assess vast quantities of data, recognize complex patterns and intuitively understand their significance. It can form a picture of the next steps in the problem-solving process. It can manipulate images and move them through time and space, transforming them into completely new concepts. Its creative potential is unlimited.

Not so with traditional computers, whose output, especially in scientific and technical applications, has been limited to row after row of numbers or single, static images. When humans must adjust to these limitations, it is at the cost of creativity and intuition. Today, many scientists spend at least as much time adapting their ideas to their computer tools as they do thinking about the ideas themselves.

The new generation of interactive computers, however, may provide a better match for sophisticated human capabilities, allowing scientists to focus their energies where they belong: on the fundamental questions of their research. At the National Center for Supercomputing Applications, the potential of this new technology has sparked the creation of "renaissance teams" consisting of scientists,

graphic artists and computer programmers. Each team member brings his own set of skills and knowledge to the conceptualization and subsequent visualization of particularly difficult scientific problems.

This new approach to scientific computing will enliven entire fields of research, such as human anatomy, that have stagnated due to limited tools. The new computers have the potential to let anatomists simulate complex joint and muscle movements never before visualized and, therefore, never before fully understood. They may enable scientists to peer into the human anatomy with a clarity of vision never before possible, providing them with 3-D views from any vantage point.

Used to full potential, these new interactive supercomputing tools could open up whole new fields of inquiry, possibly providing answers to questions that we have not yet dared to ask. •

THIS IS WHERE existing supercomputers fall short: Because the designers of the original supercomputers did not foresee the ultimate need for converging graphics and compute power, they did not build their machines with interactivity and visualization in mind.

more than graphics. He also requires the computer horsepower necessary to calculate the stress on each chemical bond, so that an accurate representation of each potential configuration can be created.

But the scientist need not stop here. If even greater graphics and compute power are applied, a giant leap in capabilities can also be achieved. The scientist can manipulate each image according to the physical laws that govern its molecular structure. He can try new configurations,

compute power, not graphics, that has been the chief barrier to its full realization. The 3-D graphics and solids modeling capabilities required for visualization are among the most compute-intensive tasks in computer science. The ability to further manipulate images requires even greater compute power, beyond that of even today's largest supercomputers.

But it also requires something else: a computer architecture that can facilitate the blending of both speed and graphics.

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COMPUTER INDUSTRY

INDUSTRY INSIGHT

Nell Margolis

Bridging the learning gap



"A little learning is a dangerous thing..."
Alexander Pope

With users clearly in the driver's seat of an industry marked by tear-away technological advances and breakneck competition, access to an awe-inspiring amount of information is increasingly easy and cheap.

Great, right? Not always. The suggestion is beginning to surface that for some end users — sophisticated professionals in many cases, but new to the information-inundation game — the computer industry is serving up too much of a good thing.

Users of today's desktop or laptop computers, not to mention those who end up with encyclopedic information in the palms of their hands, are the privileged recipients of technology that thousands of develop-

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Inside

- Informix enters the ranks of the profitable. Page 67.
- IBM tagged as California's alleged largest contributor to ozone depletion. Page 66.

A surviving Mentor

Hardware will remain, despite Apollo buyout

BY HELEN PIKE
CW STAFF

BEAVERTON, Ore. — Behind the headlines of Hewlett-Packard Co.'s plan to buy the financially struggling but technically sophisticated Apollo Computer, Inc. lies another story about another company: Mentor Graphics Corp.

The 8-year-old company is the leading supplier of engineering design software that runs almost exclusively on Apollo workstations. It resells the 32-bit computers by bundling its applications for the electronic design

12% of the Massachusetts company's annual revenue. Last year, Mentor earned \$33.5 million on revenue of \$300 million.

For now, the HP acquisition signals that there will be continued Apollo hardware for Mentor's varied customer base, which ranges from Next, Inc. to Honeywell, Inc.'s Marine Systems Division to NCR Corp.'s Personal Computer Division to Boeing Corp. Yet bobbing on the horizon is speculation of an alternative platform — HP's Precision architecture, which is expected to carry some amazing performance punch in the early 1990s.



Langelier says Mentor wants to stick by Apollo's side

automation market, of which the primary users are semiconductor designers.

Mentor is Apollo's largest single customer, accounting for

No secrets here

"We made no secret that DEC, IBM, Sun and HP were trying to woo us to a second platform," said Gerry Langelier, president and chief operating officer at Mentor, about a process that in recent years also included interest by Apple Computer, Inc. for its Macintosh.

"We let it be known that if they wanted us, they should do something about Apollo," Langelier added about Mentor's desire to stick by Apollo's distributed processing and networking architecture. Apparently, "HP took us quite seriously and saw an opportunity there."

But HP's Apollo purchase does not mean Mentor will rush to diversify its products on another platform. "That assumes you burn no greater energy standing on two legs than on one. That's not true," Langelier said,

One car, one \$9.8M firm

A one-car garage is no big deal. You could say this one has done a bit better as a high-tech cauldron. Last week, the state of California dedicated the garage — where friends and partners David Packard (at left in both photos) and William Hewlett (today and, below, in 1939) launched Hewlett-Packard Co. — as a historic landmark and the birthplace of Silicon Valley.



characterizing the company's position as "wait and see."

Rather, Mentor is burning more energy on its Falcon Project, a \$100 million research and development effort undertaken

about three years ago to make its software tools less proprietary and more integrated by writing them in C++, the object-oriented programming language.

Continued on page 72

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IN BRIEF

Changing times

Milpitas, Calif.-based **System Industries, Inc.** announced a restructuring plan under which it will lay off 120 — 22% — of its North American employees, discontinue certain operations, consolidate facilities and try to ally with other corporations. Times have been rough lately for the maker of Digital Equipment Corp.-compatible data storage devices: Its most recent quarter brought a \$25.9 million loss and a patent infringement lawsuit from DEC.

Gimme five

Sematech, the Austin, Texas-based consortium of 14 computer industry companies and the Defense Advanced Research Projects Agency (DARPA) announced its first five joint research and development contracts last week. Joining the consortium in an effort to bolster U.S. semiconductor strength will be **ATEQ** in Beaverton, Ore.; **GCA**, an Andover, Mass.-based subsidiary of General Signal Corp.; **Hewlett-Packard Co.** in Palo Alto, Calif.; **Westech** in Phoenix; and a team of three gas companies.

In MIT's yard . . .

Consortiums are also in bloom at the northern end of the Austin-Boston axis. The **Consortium for Superconducting Electronics**, whose name tells it like it is, was launched last week by **AT&T**, **IBM** and **MIT**.

Go green

Microage, Inc., which was tapped earlier this year as one of two national dealer chains authorized to market and support **AIX** — **IBM's** flavor of **Unix** for the Personal System/2 — got another green light from the industry giant last week: authorization of 36 locations of subsidiary **Microage Computer Stores, Inc.** as **AIX** dealers.

Go West

Twenty-year **IBM** veteran **Dennis W. Andrews** — most recently head of strategy, plans and support at **IBM's** Advanced Workstation Division in Austin, Texas — will be the new vice-president of systems software at **Xerox Corp.'s** development and manufacturing operations in Sunnyvale, Calif.

Trading places

Reuters Japan Ltd. and **Sony Corp.** are teaming up to develop a workstation tailored to handle both English and Japanese data and aimed at the financial community, the companies announced last week.

IBM called a polluter

BY J. A. SAVAGE
CW STAFF

SAN JOSE, Calif. — **IBM** was accused late last month of being the largest California contributor to the depletion of the Earth's ozone layer.

Members of **Citizens for a Better Environment (CBE)**, based in San Francisco, massed at the company's storage-device manufacturing site here to demand that **IBM** phase out the use of ozone-depleting solvent during the next year.

An **IBM** spokesman said the company would decrease its chlorofluorocarbon

(CFC) emissions but provided no timetable for the promised action. The company agreed that **CBE's** count of its CFC emissions — 1.47 million pounds in California in 1987 — was correct. That number is three times the amount of the next highest polluter.

Pointing the finger

CBE found five computer companies among the top 25 emitters of the ozone-depleting chemical. Other polluters that were identified by the environmental group were **Convergent, Inc.**, **Hewlett-Packard Co.**, **Seagate Technology Corp.**

and **Unisys Corp.**

IBM maintains that it has reduced its California emissions to 640,000 pounds since 1987, the last year for which emissions figures are publicly available. That figure, however, is still nearly twice that of the next highest polluter, a laboratory. **IBM** said it uses 16 million pounds of CFCs annually worldwide.

CFCs are used as solvents to clean electronic parts, from semiconductors to circuit boards. The computer industry contributes from 20% to 30% of all CFC emissions worldwide.

Other sources are refrigerants, aerosols and blowing agents for foam products. Originally, the chemical was used widely because it is nontoxic to humans in direct contact.

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Informix captain rights ship, navigates back into the black

BY PATRICK WAURZYNIAK
CW STAFF

MENLO PARK, Calif. — When former Wyse Technology President Phillip E. White started the year at Informix Software, Inc., the newly appointed chief executive officer's first goal was to bring the ailing database software maker back into the black.

And he did. Last year, Informix was buffeted by two successive quarterly

losses, a 15% reduction in its work force and delays in its new office automation products. In its first fiscal quarter, which ended April 1, however, the company turned a modest profit of \$481,000, compared with a loss of \$4.8 million in the same quarter last year. Revenue of \$31 million marked a 20% rise over fourth-quarter 1988.

"We're a \$100 million start-up that just had its first profitable quarter," quipped White, also a veteran of San Jose-

based Altos Computer Systems, Inc. and IBM.

To turn the corner, Informix reorganized its product development and marketing functions into two divisions. Last February, the company began shipments of its delayed Wingz graphics spreadsheet for Apple Computer, Inc. Macintosh personal computers.

The new product is the first of several office automation products to come from Informix's 1988 merger with Innovative Software, Inc., an office automation firm based in Lenexa, Kansas. Traditionally oriented toward value-added resellers, Informix is

selling Wingz through major software distributors and through retail chains such as Egghead Discount Software, Inc. and Businessland, Inc. stores.

White said the firm plans to integrate its office automation, relational database and tools products more tightly and will focus its office automation line on three platforms: the Macintosh; MS-DOS and OS/2; and Unix. The company, he said, is depending on Wingz to open up the retail route and the desktop market for its office automation and database lines.

David G. Bayer, an analyst at Montgomery Securities, said that in his opinion, the jury is still out on the new Informix.

"They've shown a strong ability to keep up revenue, but our concern is that we've only seen one-quarter of benefits from the cost controls such as the layoff of staff," Bayer said.

"The OA market has been tough for them in the last eight months," he added.

"The problem is that they have been



Informix's White
basks in black ink

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PHILLIP E. WHITE
INFORMIX SOFTWARE

merchandising a product, Wingz, that they haven't been able to ship, and there's also been a significant slowdown in their Smartware line," Bayer said. Updated Smartware office automation products shipped earlier this month.

On the other hand, Informix's database business recently has seen robust growth, Bayer said, noting that that side of the business has been "carrying the company for some time."

Differentiation, Bayer said, has become an indispensable element in a hotly contested database market, where "the battle is being won on things other than technical quality."

Informix could get a boost in this key area, he said, if its plans to add object-oriented and image-handling capabilities to the database line later this year are successful.

John Larch, data systems specialist at the Oregon Department of Transportation in Salem, Ore., seemed unruffled by Informix's recent fiscal problems. Larch, who uses the Informix fourth-generation language and SQL database products to help automate the weighing of trucks on state highways, said he has not found an application in which the Informix products do not work.

"We find it suits our purposes to a T," Larch said of the Informix database, which automatically weighs and catalogs database information on each truck that passes through its scales.

Informix plans to offer a Wingz spreadsheet on OS/2 Presentation Manager, on Unix platforms with the Open Look interface developed by Sun Microsystems, Inc. and on the Open Software Foundation's Motif graphical user interface for Unix. White said those versions, and potentially others for windowing environments like Nextstep, will be out before the end of calendar 1989.

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Margolis

CONTINUED FROM PAGE 65

ers have toiled to make accessible. Unfortunately, a lot less attention has been lavished on making the information understandable.

To put it bluntly, that's not computer vendors' business. They've taken care of the hardware and software; the brainware is supposed to be supplied elsewhere. In fact, it's supposed to be supplied by the education system and by common sense, neither one of which is enjoying a reputation for dependability.

That might be why you're beginning to hear stories such as these:

A noted litigation law firm in a major

East Coast commercial center implemented an automated docketing system. The custom software, according to the firm's information systems director, was designed to track each attorney's court cases, calendared appearances and required filings. Using information filed in a centralized database, the system could remind the lawyers of where they should be in a case, literally and figuratively, on a daily, weekly and monthly basis.

In this case, the users would have known what to do with the information once they got it. What they could not get their minds around, the IS director said, was the idea that they could not get it unless and until someone loaded and constantly updated the database. The minute the PCs were on partners' desks, the

IS director said, they assumed the information was in there. (It makes a certain amount of sense; after all, when you put a television in your bedroom, you don't have to input the actors and ads.) For the first time in firm history, lawyers began to miss court dates. Filing deadlines came and went, unheeded. When asked, the bewildered (and, before long, infuriated) attorneys said, "But I logged on yesterday, and the computer didn't say a thing about a reply due in the XYZ case on the 15th . . ." Today, the docketing system is history; so is the IS director.

Meanwhile, the IS director at one of the nation's leading insurance companies said that his development crew was in the final stages of perfecting the technology for issuing life insurance policies

from laptop computers. Soon, he said, agents from coast to coast will be able to take a prospect to lunch and, using a laptop-based software program communicating with the mainframe at company headquarters, have a policy issued before dessert.

The IS head confided, however, that he was planning to sit on the breakthrough technology for a while. His concern, he said, was the maturity problem. What, that the industry is mature? No, that the agents might not be. Armed with a barrage of information they might not fully understand, he said, "I'm concerned that some of them will get carried away with whiz-bang technology and wow the [clients] rather than serve them."

Cut to yet a third major metropolis, where the real estate market has slipped from unspeakably high to merely shocking. Earlier this month, local industry spokesmen attributed the slump to developers who are giving their clients the finger; that is, the finger applied to a pocket calculator.

The first and ultimate end-user computer, said one real estate firm executive, is putting Pope's "dangerous thing" at the fingertips of eager, ambitious developers who dazzle their clients — and maybe themselves — with a display of numerical prodigiousness that has lots to do with pie in the sky and little grounding in the realities of reality.

Considering that we have yet to resolve the issue of whether it is guns or people with guns that kill people, maybe we're not ready to tackle the question of where the responsibility falls when a user with an itchy trigger finger gets hold of a loaded pocket calculator. But we probably ought to be aiming to try.

Margolis is *Computerworld's* senior editor, industry.

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NICKELS & DIMES

Synoptics Communications, Inc. reported revenue of \$14.7 million and net income of \$1.9 million for the first quarter ended March 31. This compares with revenue of \$4.3 million and net income of \$555,000 for the same period last year.

Aldus Corp. announced revenue for the first quarter ended March 31 of \$23.9 million, a 50% increase from the \$15.9 million reported in the first quarter last year. Profits were \$4.3 million, up 38% from the \$3.1 million for the same period last year.

Sterling Software, Inc. reported revenue for the second quarter ended March 31 of \$45 million, compared with \$39.9 million in the previous year. Profits were \$2.5 million, compared with \$1.4 million a year ago.

Businessland, Inc. announced revenue for the third quarter ended March 31 of \$293.3 million, compared with \$251.5 million last year. Profits were \$8.5 million, compared with \$5.4 million in the like period a year ago.

Sungard Data Systems Inc. reported net income for the first quarter ended March 31 of \$3 million, compared with \$2.4 million a year ago. Revenue for the quarter was \$35.5 million, compared with \$28.3 million reported last year.

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Tough times confront second-tier vendors as PC buyers turn to the big Three. Page 4.

Digital Continental Information Systems stumbles after acquisition, faces tough financial choices. Page 12.

BP plans LAN Manager repackaging for Unix systems. Page 8.

Despite 3000 delays, IBM's high-end storage controller wins early user endorsements. Page 27.

Court: States may tax net traffic

BY MITCH REITS
Columnist

WASHINGTON, D.C. — A U.S. Supreme Court ruling last week will allow states to tax interstate voice and data traffic.

With several states having already enacted such taxes and others desperately seeking new sources of revenue, the decision could raise the cost of business communications and affect the location of data centers.

The decision upholds an Illinois law imposing a 3% excise tax on interstate voice and data transmissions that begin or end in the state. Approximately a dozen states have similar taxes, and more states are expected to follow suit.

Axied with taxes Illinois collected \$142 million in taxes by mid-1987 and continues to collect revenue at a rate of \$10 million per month from business and residential users, according to a court filing.

Business network managers, especially those with high-end

data transmission networks such as online reservation systems, may wind up moving their data centers to "tax haven" states that do not impose telecommunications taxes, according to experts.

"This will definitely affect site-location decisions," said Kenneth L. Phillips, vice-president of telecommunications policy at Calkins in New York and chairman of the Committee of the Conference of the Commissioners of the U.S. Supreme Court.

Revenue enhancers A state also could have some form of tax on interstate information, and more are expected to follow in a trend that will grow right from the U.S. Supreme Court.



On SQL Server's test trail

BY DOUGLAS BARRETT
Columnist

A glaring shortage of front-end development tools and the lack of a finished product has not stopped a handful of the U.S.'s biggest corporations from testing SQL Server applications.

SQL Server, announced one year ago by Ashton-Tate, Corp., Microsoft Corp. and Sybase, Inc., is a multiprocessor database engine designed for the OS/2 operating system.

It implements the so-called client/server architecture, under which a server handles data management while users' workstations provide the interface or front-end.

Users who are anxious to get cracking have been forced to buy the \$1,995 Network Development Kit, which is essentially a beta-test version of the software.

Of the 800 units sold, some 200 to 250 have been shipped up by corporations, according to Microsoft SQL Server product manager Dave Kaplan.

System One Systems Services, a subsidiary of Texas Air Corp., already has a prototype application running under SQL Server, and the results are promising. Carl L. Abraham, president of System One, says that SQL Server will fall below \$100 a year.

But vendors that raised system prices during the death— including Apple Computer, Inc., and the results are promising. Carl L. Abraham, president of System One, says that SQL Server will fall below \$100 a year.

Chip prices drop; PC prices don't

BY WILLIAM BRANDEGE
Columnist

While several vendors used January as an excuse to hike personal computer prices last year, no one is yet promising to bring them down now that the shortage is over.

According to memory-card product vendors and industry analysts, dynamic random-access memory chips are now increasingly available, and prices are dropping. Prices of 1M-bit chips are projected to plummet more than 50% by year's end.

Already, the volume purchase price of 1M-bit chips has dropped to less than \$20 per chip. When the memory crisis peaked in June, the price hovered at \$50 to \$60. Semiconductor price trackers now project that chip prices will fall below \$10 a year.

But vendors that raised system prices during the death— including Apple Computer, Inc., and the results are promising. Carl L. Abraham, president of System One, says that SQL Server will fall below \$100 a year.

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*The Wall Street Journal (1987) — "Survey of the Information Processing Marketplace."
*The Adams Co. (1988) — "Information Systems Management Study."

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IBM changing sci/tech guard

BY NELL MARGOLIS
CW STAFF

ARMONK, N.Y. — IBM Vice-President and Director of Research John A. Armstrong will come to work Thursday as the company's new vice-president of Science and Technology, reporting to Chairman John F. Akers.

The longtime IBM veteran, whose accomplishments in physical science have also won him the George E. Pake Prize of

the American Physical Society and a 1988 presidential appointment to the National Advisory Committee on Semiconductors, replaces IBM Senior Vice-President Ralph E. Gomory, who will retire from both his post and the company this week and take on the mantle of president-designate of the Alfred P. Sloan Foundation.

In an interview last week, Armstrong said he planned to steer Science and Technology along the course set by Gomory when he took over its stewardship almost three years ago.

"As director of research, I've been part of Mr. Gomory's plan, and I think

we're on the right track," Armstrong said. "I'm convinced we've got a good thing going. I don't plan any major changes."

Under Armstrong, as under Gomory, Science and Technology will be "working to shorten development cycles and to facilitate the process of technology transfer," said the division's new leader.

Making a major step in that direction, Armstrong met with the president of Rensselaer Polytechnic Institute in Troy, N.Y., late last week to inaugurate an IBM/RPI joint program that will develop very advanced electronic packaging technology.



IBM's Armstrong will stay the course

Acquired Apollo will retain a familiar look

BY MICHAEL ALEXANDER
CW STAFF

BOSTON — While it won't be business as usual, Apollo Computer, Inc. will not change dramatically now that it is part of Hewlett-Packard Co. That is the message executives of HP delivered at a press conference last week, held here to outline the steps that HP plans to take to integrate the two companies.

Although Apollo will become a division within HP's Workstation Group, its headquarters will remain in Chelmsford, Mass., and it will continue to manufacture and market its DN series workstations, according to HP.

David M. Perozek, a 16-year HP veteran, will take over as general manager of the newly established division. Perozek will replace former Apollo Chief Executive Officer Thomas A. Vanderslice, who left the company last week. Perozek will report to Bill Kay, general manager of HP's Sunnyvale, Calif.-based Workstation Group.

"It is important from our point of view that the new general manager be a Hewlett-Packard general manager," Kay said. Perozek is a "strong strategist" who will be responsible for bringing the resources of HP and Apollo together, he said.

Perozek will be responsible for the development, manufacturing, marketing and support of Apollo-made products. He most recently served as general manager of HP's Imaging and Obstetrical Care Business.

A newly formed interim merger/management organization will be charged with melding the people, processes and organizations of both companies into a unified business, an HP spokesman said. Brian Moore, general manager of HP's Computer Manufacturing and Planning Group, based in Cupertino, Calif., will head the merger organization.

HP does not plan to lay off any of Apollo's employees, Kay said. Those with duplicate functions will have the opportunity to move to other HP divisions, he said.

According to several of its executives, HP will fuse the two companies' research and product-design efforts for a new generation of systems based on the Motorola, Inc. 68040 microprocessor; it will also merge application software available for Apollo Domain/OS and HP-UX, HP's operating system based on AT&T's Unix System V Interface Definition Issue 2. HP will introduce a "major performance upgrade" for Apollo's DN10000 workstations and servers in November, said Mark Tolliver, marketing manager of HP's Workstation Group.

The company also said that it will move toward an Open Software Foundation (OSF)-compliant operating system and introduce its first OSF product next year.



HP's Perozek heads new unit

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Used computers to get a fair shake

BY MITCH BETTS
CWI STAFF

WASHINGTON, D.C. — Computer dealers scored a major victory earlier this month when a federal appeals board put the U.S. General Services Administration (GSA) on notice that it must not discriminate against used computers in federal procurement policies.

Specifically, the GSA Board of Contract Appeals ruled that it was unreasonable for the GSA to exclude used computers from its multiple-award schedule, a list from which federal agencies can order information systems.

The ruling upheld protests lodged by two used-computer dealers, Insyst Corp. in Burke, Va., and National Computer Equipment Corp. in Troy, Mich. It was a victory for computer dealers as well as U.S. taxpayers, because used computers are generally less expensive than new ones, said a spokeswoman for the Computer Dealers & Lessors Association.

Acting purchasing agent

Under the GSA's multiple-award schedule program, the GSA acts as a purchasing agent for federal agencies and negotiates a government discount with approved vendors. For its fiscal 1990

schedule, the GSA excluded used computers on the grounds that spot market prices for used computers fluctuate too much for the GSA to determine whether commercial prices are reasonable.

However, Administrative Judge Robert W. Parker scoffed at that rationale as "grossly inadequate." Noting that there are several market indexes and "blue books" for used-computer prices, he said, "We have no doubt that, with a little effort, GSA could come up with a reasonable solution to the problem that it perceives."

Parker added that such efforts would prove worthwhile, since the lower prices for used computers mean that "the government can never lose money by including used equipment on the schedule."

Mentor

CONTINUED FROM PAGE 65

It is a smart move, according to one industry observer. "They are developing technology to address emerging markets," said Robert Herwick, an analyst at venture capital firm Hambrecht & Quist, Inc. in New York.

With the runaway lead in electronic design automation, Mentor is training its sights on the mechanical design market. Now, with an all-new C++ tool environment, Mentor can woo more computer-aided software engineers.

Because all of this design activity generates more data, Mentor has uncovered a profit stream in document publishing. Its context division is an offshoot of the document management needs of its aerospace, engineering and manufacturing design customers.

Herwick attributed some of Mentor's success in the computer-aided design market to luck and its competitors' flawed strategies. In the 1980s, Mentor was led by a group of "young, ambitious men," he said about the original nine who left the computer-aided engineering firm Tektronix, Inc. in nearby Beaverton.

"With skill and luck, they picked the

At A Glance

Mentor Graphics

Established: 1981

President and COO: Gerard H. Langer

Headquarters: Beaverton, Ore.

Software: Based on a user interface and database structure called Idealib; includes text processing, window and database management

Hardware: Apollo workstations

Employees: Approximately 2,000 worldwide

1988 net revenue: \$300.8 million

1988 net income: \$33.5 million

1988 R&D: \$33.8 million

Falcon Project: A \$100 million multiyear project to develop a new generation of object-oriented tools written in C++

SOURCE: MENTOR GRAPHICS CORP. CW CHART: DOREEN DABLER

right strategies. But they were also naive. In 1985, they made their share of mistakes," he said. Among those errors was an accumulated software inventory that became obsolete as the electronics industry got mired in a downturn.

"Up until 1985, all we cared about was revenue growth," Langer said. By learning how to manage assets, the firm improved its financial performance, pumping net income up from \$7.9 million in 1985 to \$33.5 million in 1988. Revenue shot up during that time from \$173.5 million in 1986 to \$300 million in 1988.

Although Langer said the company will stay its course in the technical market, he said the trend to merge technologies across the historically large boundary between commercial and technical computing will continue.

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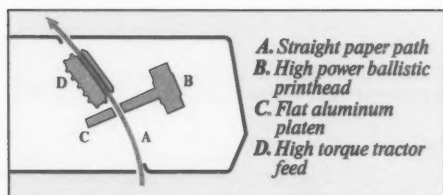
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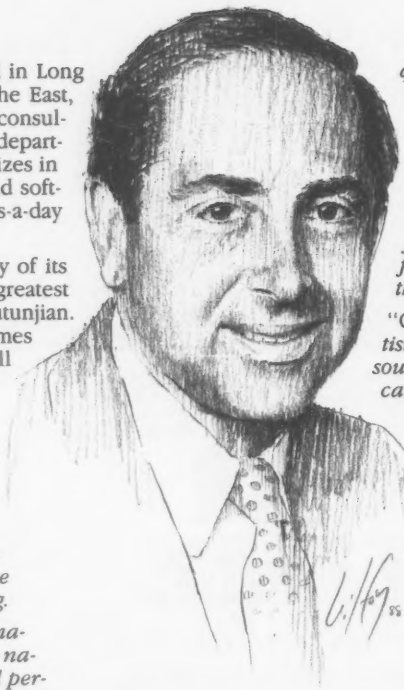
— John Tutunjian
Chairman
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COMPUTER CAREERS

Selecting a winning broker

The road to independent consulting can be fraught with sudden perils

BY JANET RUHL
SPECIAL TO CW



Most information systems professionals striking out on the road to contract consulting rely on broker firms to find work for them. It is only those rare few who have mastered the art of working with such consulting firms, however, who go on to build a successful practice.

Working with a broker is not an easy feat. Unlike a relationship with a headhunter, which has a defined end point, the relationship with a broker is an ongoing one. The consultant is paid by the broker, not the client, and the consultant's reputation, rightly or wrongly, rests squarely on the shoulders of the firm that represents him.

Once he places the consultant, the broker makes a significant amount of money for every hour that the consultant works — often 25% to 40% of every dollar that is billed to the client — although the broker's contribution may be limited after the initial contract.

Since their success depends on the quality of the representation, IS professionals who consider breaking into contract consulting should learn how to

choose the brokers with whom they will work. The following strategies have been used by successful consultants to maintain positive relationships with their brokers.

• **Make the nature of the relationship clear.** Many consulting companies, particularly the larger, well-known ones, maintain staffs of salaried consultants. These companies concentrate on placing their own salaried employees first and only place a contract consultant when a client has a need that no one on their staff can fill. Do not expect a broker to pay you a subcontractor's higher hourly rate unless you possess specialized skills that distinguish you from the firm's salaried employees.

Even if you do, many consulting firms insist that you go on the payroll as an employee, albeit one paid by the hour with no benefits.

If you want to run your consulting practice as a small business and therefore need to maintain independent contractor status — an option still feasible in spite of Section 1706 of the Tax Reform Law of 1986 — it is vital that you work with a broker who will treat you as an independent contractor. It may take some work to find one, but once you accept a salaried consultant position it may be much harder

to convince the Internal Revenue Service in the future that you can meet the tests required to defend an independent contractor status.

• **Check out the broker.** You should expect a broker to thoroughly check your references

before placing you. The first tip-off that a broker has no idea where or how to place you can be a garbled resume put together after your initial interview.

• **Recognize symptoms of trouble ahead.** Refuse to work with a broker who submits your resume for a job without contacting you first. This kind of behavior could alienate other brokers whom you have authorized to submit your resume for the same job. It also could alienate manag-

ers who are shown your resume as part of a "bait-and-switch" maneuver.

Refuse to work with a broker who quotes you one rate for a job in the initial advertisement or phone contact but then offers a lower rate for the same job at the interview. Similarly, beware of the broker who presents you with a contract to sign on which the rate appears with significant "expenses" deducted from it that were not mentioned from the start.

• **Scrutinize the contract itself.** The contract you sign with a consulting firm is a binding legal document. Ignoring its provisions can land you in court. You must be prepared to honor the

contract, so before signing anything, remind yourself that the contract the broker hands you was drafted by his lawyers and was drafted to defend his interests — not yours.

Contract areas that are particularly likely to cause trouble are clauses that limit your consulting activities after the present contract terminates and clauses that bind you to extend the contract on the same terms as the original contract if the client requests it.

If your skills are not strong enough to place you in a position to negotiate this base contract aggressively, you should probably not consider consulting at this phase in your career.

One good source of up-to-date information about contract provisions and the contract consulting market is the Independent Computer Consultants Association (ICCA). Regional chapters of the ICCA hold monthly meetings. In addition, members answer questions about consulting 24 hours a day on the association's Compuserve Consult Forum, and the group maintains a toll-free phone number (1-800-GET-ICCA).

The ICCA is currently compiling a list of consulting firms throughout the country that will work with consultants who wish to maintain independent contractor status.

Ruhl is a consultant programmer in Windsor, Conn., and author of *The Programmer's Survival Guide: Career Strategies for Computer Professionals*.

IF YOUR SKILLS are not strong enough to place you in a position to negotiate this base contract aggressively, you should probably not consider consulting at this phase in your career.

before placing you. It is equally important that you check out the broker. Talk to consultants who have worked with the broker and try to speak with managers who have hired consultants from the firm to get a feel for their quality.

Avoid companies that have a reputation for consistently winning contracts by submitting the lowest bid — these firms may pay the lowest rates or supply consultants who lack the skills that salespeople claim. Don't neglect to ask programmer friends about the skills of consultants they have worked with.

Once you have gotten past the preliminary screening, insist that the broker let you see the resume he plans to use in mar-

ers who are shown your resume as part of a "bait-and-switch" maneuver.

Refuse to work with a broker who quotes you one rate for a job in the initial advertisement or phone contact but then offers a lower rate for the same job at the interview. Similarly, beware of the broker who presents you with a contract to sign on which the rate appears with significant "expenses" deducted from it that were not mentioned from the start.

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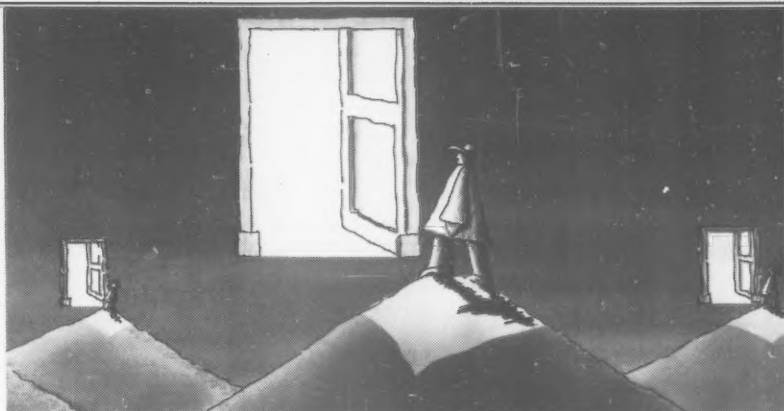
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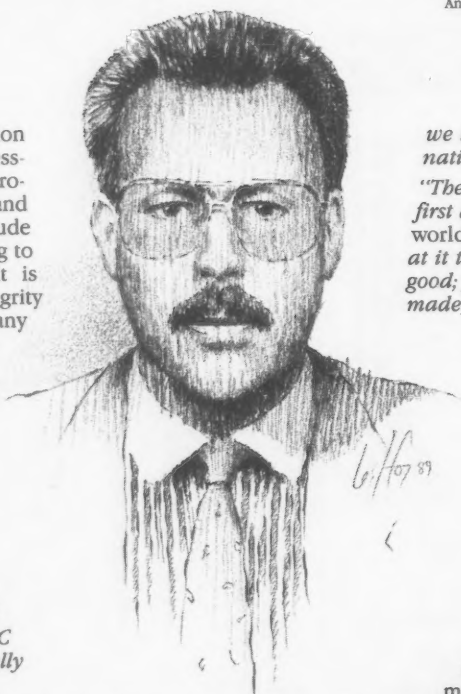
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MARKETPLACE

Clearing desks for scanners

Falling prices, more software help fuel popularity of low-end machines

BY KEVIN BURDEN
CW STAFF

The growing popularity of desktop scanners suggests this emerging product might be losing its luxury status. With substantial price cuts and the introduction of improved software, more and smaller companies are expected to use the machines.

Desktop scanners are not brand-new; they have been around since the desktop publishing phenomenon took off in 1985. But early models were viewed as costly devices — so-called time savers that often cost more in time spent on corrections than they saved in data entry.

"Back then, scanners were rudimentary, and no one had any idea what to use them for," says Julie Desrosiers, associate director at market research firm BIS CAP International, Inc. in Santa Clara, Calif.

While high-end scanners will experience decreasing rates of market growth, unit shipments of desktop models will increase 33% per year in coming years, according to Venture Development Corp., a Natick, Mass.-based market research firm. Sales should rise from 36,000 units in 1988 to about 120,000

in 1992, according to the firm.

The growth of the desktop segment can be traced to several developments, the most important of which is falling prices. Few desktop publishers, by far the largest segment of desktop scanner users, can rationalize the \$40,000 required for a high-end scanner. Companies that can do so tend to be heavyweight publishers, data archiving firms and others with a pressing need.

Desktop scanners, on the other hand, are slipping into the affordable price range, in which a

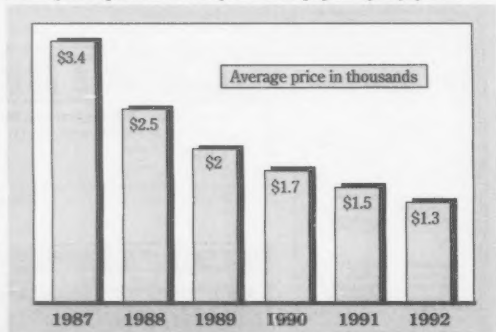
broader spectrum of users find them worthwhile. Today the machines can cost anywhere from \$200 to \$10,000, depending on their power. Venture Development expects to see annual declines in price of 12%.

Prices have dropped as vendors such as Hewlett-Packard Co. and Truvel Corp. try to capture market share and establish themselves as industry leaders, according to Leone Johnson, project manager at Venture Development.

Vendors understand that

Plunging prices

Prices of desktop scanners are expected to drop by nearly half by 1992



SOURCE: BIS CAP INTERNATIONAL, INC.

CW CHART: DOREEN DAHL

many potential customers are not sure what to look for in features and therefore buy according to price, leading the vendors to compete on price rather than features, according to Desrosiers.

"It took a while to feel out the market, but vendors are finally starting to realize at what price level they'll see acceptance for these devices," she says.

Improved software

Low prices cannot claim all the credit for the projected growth rate, however. The availability of improved scanning software is also playing a large role.

Both hardware and software for desktop scanning have become more versatile. Unlike high-end scanners, which are often feature-laden and geared for a specific application, a single desktop model can be used for graphics, OCR, facsimiles or teleconferencing.

"This is how we now see end users justifying the cost," says Bart Mallio, a research analyst at BIS CAP International in Newtonville, Mass. "They might buy it for its OCR capabilities but are now able to justify the expense from the extra functions," Mallio says.

Furthermore, scanning software packages that reside on personal computers allow better control over resolution and the number of gray tones than the primitive line art scanning packages of five years ago did.

Despite price cuts and technological progress, many potential users continue to view scanners as luxury items rather than essential hardware. Such would-be buyers might not know what a scanner can do for them, and even people who do know still might not view a scanner as cost-effective, according to analysts.

Dealers, too, lack an understanding of the capabilities of scanners, Desrosiers says. "Vendors are beginning to realize that the people who are doing the actual selling don't even understand image or text scanning. If they don't know how it works, how will they ever convey it to the user?" she asks.

As a result, analysts say, vendors are starting to realize that an educational effort lies ahead of them if scanners are to become general-purpose tools.

Burden is a researcher at Computerworld.

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The BoCoEx index on used computers

Closing prices report for the week ending May 19, 1989

	Closing price	Recent high	Recent low
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XT Model 086	\$850	\$1,150	\$850
XT Model 089	\$1,175	\$1,400	\$950
AT Model 099	\$1,500	\$2,000	\$1,500
AT Model 239	\$1,800	\$2,100	\$1,775
AT Model 339	\$1,850	\$2,375	\$1,800
PS/2 Model 60	\$3,075	\$3,100	\$2,500
PS/2 Model 80	\$3,850	\$4,100	\$3,100
Compaq Portable I	\$700	\$750	\$550
Portable II	\$1,900	\$2,100	\$1,750
Portable III	\$2,700	\$2,950	\$2,200
Portable 286	\$1,700	\$1,975	\$1,675
Plus	\$900	\$1,200	\$900
Deskpro 286	\$1,900	\$2,350	\$1,800
Deskpro 386	\$2,625	\$2,900	\$2,500
Apple Macintosh 512	\$525	\$775	\$525
512E	\$700	\$975	\$600
Plus	\$1,000	\$1,100	\$950
II	\$3,800	\$4,175	\$3,425
Toshiba T3200	\$2,800	\$3,000	\$2,725
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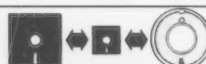
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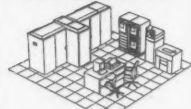
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TRAINING

Teaching 4GLs to 3GL diehards

Instructors and students need to soothe generational conflicts

BY MARK DUNCAN
SPECIAL TO CW

The widespread use of fourth-generation languages (4GL) is requiring even the most resolute third-generation language (3GL) diehards to gain a degree of fluency in something other than Cobol.

Many 3GL programmers jump at the chance to learn a new language, no matter how different it is. But inevitably, a portion of people attending a 4GL class do so under protest. The success of the training will require compromise and understanding from both instructor and student. The organization faced with teaching a 3GL audience a 4GL may find the following suggestions helpful:

• **Unlearning.** Before the instructor launches into the wonders of the 4GL, he should spend some time adjusting the minds of the 3GL audience. He can do this by explaining broad differences between 3GLs and the new language and some of the 4GL's capabilities.

During the transition from

3GL to 4GL, the Cobol programmer will have to unlearn some aspects of Cobol programming before he can learn equivalent aspects of the 4GL.

• **An end-user language.** Although many 4GLs are accepted as legitimate application development tools, some programmers still regard them as end-user languages. They are likely to harbor a mild suspicion that they are being taught something inferior to 3GLs.

The instructor, while acknowledging the longevity of Cobol and its siblings, must show when it is sensible and practical to use 4GLs. He must convince students that 4GLs can fill gaps left by a 3GL's shortcomings in speedy and unstructured development or system prototyping.

• **Internals.** Seasoned Cobol programmers possess a comprehensive and comfortable awareness of the language's capabilities — not simply what it can do, but how it does that.

The instructor must deliver similar information about the 4GL. It is easy to focus too heavily on the glamor and pizzazz of a

4GL — the condensed reporting language and instant screen generator. But this must be balanced with an explanation of what is going on behind the scenes. Contrary to popular belief, programmers are not content with simply using something — they want to know how it works.

For their part, students should approach 4GL training with an open mind. They will undoubtedly be surprised and frustrated at times in adapting to a new and different language.

Considering some of the points below may help manage those developments.

• **The Cobol hat.** When visiting a foreign country, it is instinctive to mentally convert your money to your home currency to make sense of it. But the longer you stay in the country, the less need there is for the conversion. The situation is similar with programmers learning a new language: The inclination is to conceive how a problem is solved in Cobol, for instance, and then represent the logic in the 4GL.

For simple solutions, this may work, but the sooner you throw

away the 3GL hat and don the 4GL one, the better.

• **Database design.** In a typical information systems department, a database administration group will be the major player in database design. In 4GL development, however, this responsibility is generally assumed by the programmer or analyst. So database design concepts should be a prerequisite to or a part of the 4GL class.

• **Interactive development.** Despite the emergence of code generators and prototyping tools, the bulk of software is still developed in the code-compile-test style. Programmers will experience a departure from this approach with 4GL development. Most of them will relish the interpretive nature of 4GLs, which allow easy screen design, immediate testing of code changes and other benefits.

• **Self-documentation.** Unlike 3GLs, 4GLs are rarely self-documented. Therefore, programmers should devote extra attention to documenting production 4GL code. When 3GLs are applied with structured techniques, they can produce fairly readable programs, even without additional internal comments. This is generally not the case with 4GLs.

• **Poor diagnostics.** The diag-

nostic messages issued by a 4GL will generally disappoint a Cobol programmer accustomed to compiler diagnostics or abnormal program termination messages. Also, no language has reached the mature stability of Cobol, so new 4GL programmers may frequently seek technical support from the vendor.

• **Syntactic rigor.** Because of their high level, 4GLs generally are less syntactically demanding than 3GLs, and they provide a one-to-many relationship between statements and (internal) operations. For the same reason however, it is easy to develop 4GL programs that use the CPU inefficiently. Because most programmers have an innate desire to write efficient code, they will be eager to learn about 4GL internals to enable them to do so.

Above all, the instructor and the student must maintain realistic expectations of the training. Instructors should anticipate frequent challenges, realize that any kind of change is difficult and that the transition must be managed. Students should acknowledge that 4GLs are a legitimate force in applications development and that learning one will make them more marketable.

Duncan is a quality assurance consultant at a large Dallas bank.

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Ethernet

FROM PAGE 1

leaving other vendors to provide the connections to popular networking environments such as Netbios and Transmission Control Protocol/Internet Protocol (TCP/IP).

Currently, only three Ethernet board vendors — 3Com, Ungermann-Bass, Inc. and Western Digital Corp. — have been tested for OS/2 Extended support and have IBM's official recommendation. However, IBM expects to open the interface to other NDIS-compliant Ethernet board vendors with the next OS/2 Extended release, said IBM OS/2 Extended Open Systems Support Manager Eric Nelson.

By supporting Ethernet on OS/2 Extended, IBM stands to increase the market potential for the system by 200%, according

to Rick Villars, a senior analyst at International Data Corp. (IDC), a market research firm in Framingham, Mass. By 1992, Ethernet and Token-Ring combined will account for almost 70% of all personal computer local-area network installations, according to IDC.

"We're very excited about IBM's announcement," said David Langhoff, a telecommunications planning manager at Mervyn's. The San Francisco-based department store chain has both Token-Ring and Ethernet LANs installed and is "looking at the multiprocessing capabilities of OS/2 EE," Langhoff said.

What a relief it is

By providing its first comprehensive support of Ethernet, IBM has acknowledged that Ethernet and Token-Ring networks "each address a different set of user requirements" and has also taken a lot of the headaches out

of Langhoff's job as network integrator, he added.

However, IBM will just be paying lip service to Ethernet connectivity if it does not find a way for Netbios and TCP/IP applications to access OS/2 Extended resources such as SQL databases, Langhoff said.

"It's our goal to have non-OS/2 workstations talk to OS/2 over Ethernet," Nelson said. IBM has no plans for delivering Ethernet for DOS systems, but other vendors can provide that support by supplying Ethernet software based on IBM's LAN Support Program.

The program, which is said to use the Netbios networking protocol to connect PC-DOS workstations to OS/2 Extended servers, currently works only over PC Network and Token-Ring, he added. IBM has announced no plans to migrate the program to Ethernet but "understands the requirement," Nelson said. IBM

has no announced plans to provide TCP/IP support for OS/2 Extended either, he added.

3Com plans to provide a way for its 3+Open users to access OS/2 Extended servers by November, product manager Eric Siegel said. Also later this year, 3Com plans to release software that will allow its 3+Open — and "theoretically, OS/2 EE," Nelson said — to support network applications based on the TCP/IP and Open Systems Interconnect protocol stacks.

An Ungermann-Bass spokesman said that the company also plans to provide a way for DOS workstations running its network system to access OS/2 Extended servers but would not say when it would be available.

IBM's announced support of NDIS defines Novell, Inc.'s position as a "different camp" from the IBM-Microsoft-3Com contingent, Siegel said. Novell recently released its own network

device driver interface, Open Data Link Interface, which directly competes with NDIS.

However, a Novell spokesman said that the use of different driver interfaces does not preclude interoperability between workstations using Novell's Netware and OS/2 Extended servers. The vendor is working on an OS/2 Extended edition of Netware and is beta-testing software that would allow Netware workstations to access an OS/2 Extended 1.1 server's resources, including SQL databases, he added.

3Com's demonstration of the new software showed an IBM Personal Computer AT running OS/2 Extended and the 3Com Etherlink II software interchanging data with an IBM Personal System/2 Model 60 running OS/2 Extended and 3Com's Etherlink/MC software for Micro Channel Architecture machines.

AT&T erects ISN-Datakit II bridge

BY ELISABETH HORWITT
CW STAFF

SAN FRANCISCO — Attempting to calm the abandonment fears of its Information Systems Network (ISN) users, AT&T has announced software that is said to couple the low-end data switch to its high-end sibling — and potential successor — the Datakit II Virtual Circuit Switch (VCS).

Addressing recent industry speculation that AT&T intends to phase out ISN, company District Manager Bob Donnelly maintained that the low-end switch fills a unique niche, both in terms of price and functionality (see box at right).

ISN is designed to link a limited number of terminals and hosts in campus environments, he said.

In contrast, Datakit II is a high-speed corporate backbone switch, featuring wider support of host protocols, bandwidth management, higher throughput and a "fan-out" feature that allows it to concentrate multiple incoming lines into one high-speed trunk.

The ISN and Datakit II VCS Internetworking package, introduced by AT&T last week, is said to allow customers to add Datakit IIs to an existing ISN network. This addresses users whose data traffic needs grow too great for the low-end switch to handle or who want to connect multiple ISN sites.

"Anyone with ISN, if they have many remote sites, would be interested in Datakit II" as a corporate backbone switch, said Steve Patrick, director of administrative systems at the University of Wisconsin, a major ISN customer.

The switch gap

AT&T envisions a smooth migration path from ISN to Datakit, but the capabilities are very different

Datakit II virtual circuit switch

- Maximum virtual circuits: 3,500
- Dynamic bandwidth allocation/Rerouting around faults: Yes
- Base price: \$75,000
- Target installation: Enterprise

Information Systems Network (ISN)

- Maximum virtual circuits: 1,900
- Dynamic bandwidth allocation/Rerouting around faults: No
- Base price: \$25,000
- Target installation: Building or campus

In addition to handling more circuits and bandwidth than ISN, Datakit II can provide more dynamic utilization of trunk bandwidth and can also reroute around faults without interrupting traffic instead of "tolling over and dropping everything on a trunk whenever a fault happens," as ISN does, according to Patrick.

Too much, top to bottom

However, smaller users are still discouraged by the yawning functionality and cost gap between the top of the ISN line and the bottom of Datakit's range, according to Patrick. The Internetworking software "allows ISN users to have all of Datakit's features" — but only by buying the bigger switch, he added. "That's not a real palatable suggestion to an ISN user with under 2,000 endpoints."

A group of more than 50 ISN users in the academic sector, which met last week, expressed "disappointment that AT&T has added nothing to ISN." The group wants reassurance that the vendor "isn't forcing us to upgrade to a more expensive

product," Patrick said.

Patrick said that AT&T spokesmen have told the academic ISN user group that the firm "will not force us to migrate to Datakit" and that the vendor will shortly be announcing some enhancements to the product — hopefully in the network management area.

"You can use [AT&T network management system] Starkeeper for ISN, but that means buying a \$75,000 to \$85,000 system for a \$25,000 box," he said.

The university, along with many other users, would also like to see AT&T merge ISN into a unified Datakit II product line "that starts low and builds up in a gradual manner, without these big jumps," Patrick said.

"I can't in all honesty say that AT&T will never phase out ISN," Donnelly said, adding, however, that AT&T plans to continue marketing, manufacturing and supporting the product "as long as it makes business sense."

Priced at \$4,500, the Internetworking software is scheduled for availability in October.

Cornell suspends Morris over Internet episode

BY MICHAEL ALEXANDER
CW STAFF

Cornell University officials have suspended Robert T. Morris, the graduate student accused by the school of planting a worm that shut down thousands of computers on a nationwide network last year.

In a letter to Morris dated May 16, the dean of Cornell University Graduate School said the school's Academic Integrity Hearing Board had determined that Morris had violated Cornell's code of academic integrity, according to an Associated Press report. A Cornell spokesman said that the university could not comment on the letter's contents or whether Morris had been suspended without violating federal privacy laws.

However, Thomas Guido-

boni, Morris' attorney, confirmed that Morris had received the letter and that "its contents had been accurately reported."

In April, a Cornell commission concluded that Morris had concocted the worm and sent it over Internet, a nationwide communications network linking computer systems at universities, research labs and defense installations. The report termed Morris' behavior "a juvenile act that ignored the clear potential consequences" and added that Morris was aware his actions were in violation of the university's policy for the use of the research computing facility.

Morris has not been charged by federal authorities for his alleged role in creating the worm, but the U.S. Department of Justice has been considering the case since November 1988.

Hacker nabbed in Chicago

BY MICHAEL ALEXANDER
CW STAFF

U.S. Secret Service agents arrested a computer hacker in Chicago last week for operating a scheme to use illegally acquired credit card and telephone calling numbers to obtain money through Western Union Corp.

According to an affidavit filed by the U.S. Department of Justice in the Northern District Court of Illinois, Leslie Lynn Doucette admitted that she had gotten the card numbers from hacker bulletin boards and corporate voice-mail computer systems. She is accused of using ille-

gally obtained access codes to check the validity of the card numbers.

The 35-year-old woman allegedly gave the credit card numbers to as many as 50 hackers, who then used the credit cards to purchase money orders from Western Union, payable to her. The Justice Department said that corporations and telephone service providers lost substantially more than \$200,000 to the conspirators. Special agents of the Secret Service executed search warrants in eight cities including Chicago, Boston, Los Angeles and Atlanta. Other arrests are expected.

Not many standing on low-end ESA platform

BY ROSEMARY HAMILTON
CW STAFF

It does not look as though the 4381 will become the low-end platform for IBM's prestigious Enterprise Systems Architecture (ESA) environment.

Based on interviews with users and industry analysts last week, it appears that only a small number of 4381 Es have shipped since last November. Many customers who have installed an E series said they do not see it as central to their ESA plans.

When shipments of 4381 Es began late last year, IBM gave users a way to join the ESA world with a less expensive, smaller mainframe. But few current E users fit the profile.

One user said he has short-term plans to use the 4381 as his ESA platform, but he is also looking to a yet-to-be-announced system from IBM for the future. It has been widely expected that IBM will introduce another low-end ESA-capable machine. Some analysts said they expect a new ESA-capable 9370, while others said they expect a new-generation 4381, the so-called 4391.

Some customers have found a variety of uses for the E models. For example, one site with plans for a 3090 purchase next year is using the 4381 E as an ESA stepping-stone. Another company set up its own hot site and selected a 4381 with ESA capability as a cheaper backup system for its ESA-capable 3090s. A third is using the 4381 to develop ESA-compatible applications for bigger mainframes.

"When you add it all up, there's not a lot of demand [for 4381 Es]," said Frank Gens, a market analyst at International Data Corp.'s Financial Services Corp.

According to Gens, there are two primary reasons for 4381 users to pick up an E model — as a development platform for a 3090 or for increased capacity.

Motorola, Inc.'s Cellular Group, for instance, recently

moved to a 4381 Model 91E because of the additional horsepower it offered over the company's 4381 Model 12.

"ESA wasn't our drive at all," said Scott Everhart, a systems programmer at Motorola. "We needed a box with lots more performance."

Inside, outside

Other users inside the 4381 community are unlikely ESA candidates because many of them are running the VSE or VM operating systems, analysts said. In addition, few users from outside the 4381 world are selecting this system as their ESA vehicle. According to analyst Gens, IBM "isn't selling lots of new 4381s of any type."

Customers may not see the E series as their primary ESA platform, but they said the new systems are serving them well.

At the Indianapolis Power & Light Co., a Model 91E recently underwent two successful test runs with ESA, according to Gerald Paugh, operations supervisor.

"This is just a preparatory move," Paugh said. "We feel with our growth we'll probably be with a 3090 in 12 months."

Alan Bugh, vice-president of MIS at Wilson Sporting Goods Co., said his recent purchase of a 4381 Model 92E was a solid first step into ESA. "The next step is something in between a 4300 and a 3090, whatever IBM will announce. We're anticipating a rack-mounted system, a 15-MIPS box," Bugh claimed.

The United Illuminating Co. is using its 4381 at a hot site it set up 12 miles outside of its New Haven, Conn., headquarters, according to Remington Katon, director of computer services.

"It's ESA-compatible and powerful enough for the hot site," Katon said. "We didn't need the full power of a 3090. That would have cost us about \$1 million. This was about 40% of that."

Peace, love, not look-and-feel

MIT scientists lead 150-strong anticopyright protest on Lotus premises

BY MICHAEL ALEXANDER
CW STAFF

CAMBRIDGE, Mass. — All they are saying is give programmers a chance. A crowd of 150 demonstrators, many carrying signs and chanting slogans, picketed Lotus Development Corp.'s headquarters here last week to protest the company's attempts to copyright the look and feel of its software.

The 1960s-style protest was organized by prominent MIT computer scientists, including Marvin Minsky, founder of the Artificial Intelligence Laboratory; Richard Stallman, developer of Emacs, a widely used programming editor; and Gerald Sussman, a popular professor of electrical engineering.

In April, the three scientists sponsored a half-page advertisement in *The Tech*, MIT's student newspaper, that warned that look-and-feel copyrights would cause "serious problems" for the software industry [CW, May 1].

The crowd of demonstrators, who walked a picket line for about an hour, was largely composed of computer scientists, programmers and university computer science students marching under the name of the League for Programming Freedom.

Lotus issued a brief statement asserting its right to protect its software from copyright infringement. The day before

the demonstration, Heidi Sinclair, the company's chief spokeswoman, called the protest "silly" and "a throwback to the '60s" and said that the academicians were "ignorant of the realities of the marketplace."

The protesters appeared to be in good spirits as they trooped

is not for me" and "Put your lawyers in their place; no one owns the interface."

The demonstrators also carried signs that touted "nerd power" and warned computer programmers to "look out for the lawyers." Some protestors distributed leaflets that called



Computer scientists, programmers and students join in the hour-long protest, called a 'throwback to the '60s'

from nearby Tech Square to Lotus headquarters at noon Wednesday to oppose not only lawsuits filed by Lotus (against Paperback Software International and Mosaic Software, Inc.) but also litigation by Apple Computer, Inc. (against Microsoft Corp. and Hewlett-Packard Co.) and Ashton-Tate Corp. (against Fox Software, Inc.).

Stallman, carrying a bullhorn, led the protestors, who were chanting slogans such as "1-2-3

for a boycott of products made by Lotus, Apple and Ashton-Tate and also urged computer programmers to refuse employment by the look-and-feel plaintiffs.

Lotus employees, who seemed more bemused than bothered by the protest, stared from windows above or carefully threaded their way through the picket line on their way to lunch or to board the company's shuttle bus.

IBM greets one player on SMS field

BY ELLIS BOOKER
CW STAFF

Innovation Data Processing, Inc. plans to become one of the first independent vendors to play ball with IBM's System Managed Storage (SMS) concept with a fourth-quarter release of updated versions of its data management and data backup software.

The Little Falls, N.J., compa-

ny said its data storage management tools will be faster and more flexible than IBM's products for SMS.

Announced last April by IBM, SMS promises — in conjunction with MVS/ESA — to automate the storing and archiving of data sets and choose the best resting place for information — be it direct-access storage device (DASD), tape or main memory — based on how sets are used and on rules defined by the user and held in a central repository.

When it rains

Data Facility Storage Management System (DFSMS) is the umbrella under which SMS will be implemented. Innovation's products will replace the two components inside the ESA Storage Management Subsystem facilities and control the data sets.

"We're saying our Fast Dump Restore [FDR] and Automatic Backup & Recovery [ABR] are better alternatives to what IBM calls its Inactive Data Manager

and Inactive Data Mover," said Innovation Vice-President Thomas J. Meehan. "We're not promoting an alternative to SMS."

Dean Tesar, an MVS systems engineer at Hewitt Associates, an international actuarial firm based in Chicago, noted that IBM has allowed interfaces into its open DFSMS structure.

Tesar, who has used Innovation products for several years, said he is not certain Hewitt will move to SMS on its IBM 3084 Q and Amdahl Corp. 5890 Model 600, because "we already have a lot of this [data management] now using homegrown and vendor products."

According to Innovation, its FDR DASD Storage Management product, introduced in 1972, has about 10,200 installations worldwide, with about 8,000 in the U.S., and is the leading independent DASD management system in the industry. Its ABR product, launched in 1982, is installed at about 3,000 sites, the company said.

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TRENDS

IBM mainframes

IBM mainframes are staging a comeback.

According to estimates of U.S. installations compiled by Computer Intelligence in La Jolla, Calif., annual growth has resumed after leveling out to 1% in 1984 and staying there for four years.

For the past two years, growth has climbed back to about 10% annually. Computer Intelligence attributes the recent boost to the arrival of the IBM 9370 and the steady sales of the IBM 3090 series.

The 3090 line, introduced in 1985, adds approximately 1,000 new systems every year. The strongest contributors in the group, the Model 300s and Model 600s, quadrupled in installations during the last year, Computer Intelligence said.

Meanwhile, the slow-selling 9370s have nevertheless made their mark. Since they became available in 1987, almost 5,000 have been put in place. The 9370s led the way, accounting for nearly 2,000 new systems in one year. The 9370 is technically considered a mainframe rather than a minicomputer.

Among new or on-order 3090s, nearly half are replacing other 3090 series machines as users upgrade, particularly to Model Es. Only 4% of the new or planned 3090s will replace non-IBM mainframes from vendors such as Amdahl Corp. or National Advanced Systems. Seven percent will be first-time or additional systems; that is, they will be plugged in at new sites or will be new boxes at old sites adding mainframe power.

A well-traveled route to the 9370 is from a machine in the 4300 series. More than 50% of the new or ordered 9370s are slated to replace a 4300 model, according to Computer Intelligence. Nearly a third, however, are designated as new or additional systems.

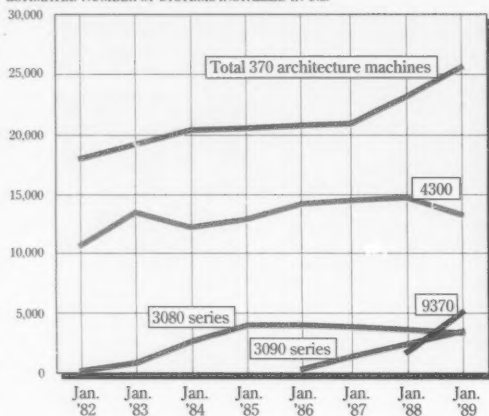
The research firm predicts this vitality trend will persist despite a downturn in 4300 and 3080 volumes. It anticipates continued growth for the 3090 series as the product approaches its peak.

Bob Djurdjevic, president of Annex Research in Phoenix, also foresees continued healthy growth for 3090s. He pointed out that hardware sales will be driven particularly by emerging application areas, such as image processing and numerically intensive applications that make use of capabilities of the 3090 with a vector processor.

LAURA O'CONNELL

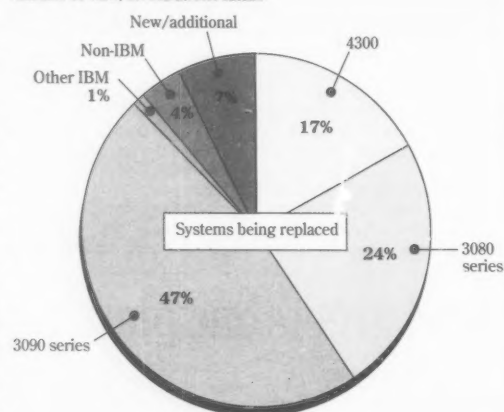
Newer lines boost population growth

ESTIMATED NUMBER OF SYSTEMS INSTALLED IN U.S.



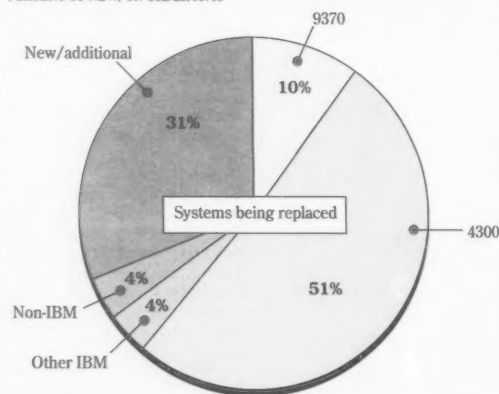
Most new 3090 users are old 3090 users

PERCENT OF NEW/ON-ORDER 3090 SERIES



Common path to the 9370 is from 4300s

PERCENT OF NEW/ON-ORDER 9370s



SOURCE: COMPUTER INTELLIGENCE

CW CHARTS: FRANK C. O'CONNELL

INSIDE LINES

Fishin' from the DB2 pond. DEC is expected to announce programming hooks next month between its VMS/RDB database and IBM's DB2 database management system. New RDB programming hooks will allow RDB to interoperate with DB2 without needing a file translation utility, according to industry sources. These hooks will allow RDB to recognize the DB2 file format immediately, which will allow VAX users to access and manipulate the DB2 files in their original form from the RDB database, sources said.

When dumb means nonprogrammable. IBM's recent Officevision announcement added two new catchphrases to a computing world desperately in need of more: the "non-programmable terminal" and the "programmable workstation." "Nonprogrammable terminal" solves the thorny problem of IBM referring to some of its products as dumb terminals. Word reportedly came down from on high that no IBM products could possibly be dumb. "Programmable workstation" replaces what IBM had been calling intelligent workstations. IBM's lawyers reportedly found some stumbling block in the use of the word intelligent. The use of either word, "intelligent" or "programmable," opens the door for IBM to offer diskless PCs, which would be programmable, or intelligent, but would not qualify as computers, strictly speaking.

PC-in-the-box. By the end of next year, fast-food company Foodmaker plans to install Compaq 386 machines in all 700 of its company-owned Jack-in-the-Box restaurants. About 280 have been installed already, according to Terry Babbitt, vice-president of MIS for the billion-dollar company, which also owns the Chi-Chi's Mexican restaurant chain. The PCs will be linked to point-of-sale systems in each restaurant for on-site applications processing and to hosts at Foodmaker's San Diego headquarters.

Life in the fast lane. Ungermann-Bass is expected this week to join the conga line behind IBM in announcing a 16M bit/sec. version of the 802.5 Token-Ring. IBM is already shipping a PC version and should be joined by other major local-area network makers in the Token-Ring fast lane as soon as user demand rears its head, an industry spokesman predicted.

Ambiguous-er and ambiguous-er. Speaking before the Massachusetts Computer Software Council last week, IBM manager of systems application architecture programs and support George Liptak clarified, yet again, IBM's approach to Unix. The AIX world and the SAA world are "separate but equal," he told the gathering, adding, "AIX is a corollary but not a primary platform." In other words, some platforms are more equal than others.

Squash that bug. We reported some weeks ago [CW, May 1] that computer scientists at Nova University in Fort Lauderdale, Fla., had published a report concluding that a hardware-induced virus in the 8272A floppy disk controller made by Intel and NEC Electronics could cause a PC to lose data. Report author Adam Phillips said he recently got threatening telephone calls from an Intel attorney, a product manager and a public relations person at Intel, telling him to "basically... keep my mouth shut," Phillips said. Intel objected to Phillips calling the hardware bug a "virus," he added. Intel, meanwhile, has refused to say how many PCs use the controller chip, and NEC has not returned calls seeking more information about the problem.

No consensus on GUI. Graphical user interfaces have been a major topic of discussion at X/Open board meetings, and a recent meeting held in Tokyo was no exception. The group has been attempting to specify a high-level standard, and a previous nonbinding vote had favored OSF's Motif. According to Steve Lowen, the subject has not been resolved, but a work effort is under way to investigate how a standard might be reached that would not specify one particular product but would provide some common ground.

Got a tip? Spill the beans to Assistant News Editor James Connolly at 1-800-343-6474 or tap into the bulletin board at 508-626-0214, -0235 or -0165.

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